A PRIMER OF TEACHING PRACTICE

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AND
C. BIRCHENOUGH

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PLATE I. FREE DRAWING BY CHILD OF SIX. (*See page* 109.)

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TEACHING PRACTICE

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WITH TWO COLOURED PLATES AND SIXTEEN FIGURES IN THE TEXT

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PREFACE

THIS little book is the outcome of many attempts to organize the preliminary professional work of Training College Students. It does not offer in any sense a theory of education, its purpose is much more modest, viz., to give a first survey of the variety of activities which enter into the complex work of class teaching. The different chapters are based upon an effort to treat these activities in isolation, in the belief that the student will best understand his business if he attacks them one by one. In this way he feels that he is making definite forward steps, and, as lessons grow more complex, he has a basis for their intelligent appreciation and criticism. Moreover, in thinking out his own lessons, he is in a position to determine his procedure with certain principles more or less clearly in mind. As actually worked out, the topics are always illustrated by demonstrations, followed by general discussion, in which the attention of the student is directed to the particular points raised.

The book is not, of course, a substitute for the study of "special" method, where procedure is modified in accordance with the nature of the subject-matter: nor is it intended to supplant courses in psychology. It is rather a general preparation for both. We have felt it important to give the student, as soon as may be,

certain rough guides which will enable him (1) to understand the points of particular demonstrations in classroom practice, (2) to appreciate the significance of what he sees in the schools, and (3) to make it possible for him to do meaningful practical work in the professional "laboratory" of the college early in his training course.

Each of the chapters is followed by exercises which are not usually reproductive in character. They are designed rather to stimulate thought, and often raise problems and difficulties which cannot at this stage be adequately dealt with, thereby preparing the way for more systematic study and experiment. It seems important constantly to bring students face to face with problems that they cannot solve. Confidence in himself is a valuable asset in a teacher, but confidence which is due to ignorance of the issues involved is, perhaps, not worth very much.

Although the book is written primarily for students in training, we hope that it may be found useful to others, Sunday school teachers for example, who are concerned directly or indirectly with teaching.

We are indebted to various friends for reading particular chapters in the book, but the attempt to treat difficult subjects simply, involves such risk of error that it seems better to take upon ourselves the whole responsibility.

J. A. G.
C. B.

The University,
Sheffield, *April*, 1911.

CONTENTS

LIST OF ILLUSTRATIONS

COLOURED PLATES

CHAPTER I.

THE TEACHER'S PROBLEM.

ALTHOUGH instruction does not cover the whole range of the schoolmaster's activities, it is chiefly as an instructor that people are accustomed to think of him; and in this book, we shall think of the art of teaching as his chief business. But to teach is to incite to learn, and in ordinary life, we learn in a great variety of ways. Sometimes we know things because somebody has told us. If the authority in such cases is trustworthy, it is at once a quick and convenient method of acquiring knowledge. Yet what we learn in this way does not usually impress us so much as the knowledge we acquire from actual experience. People may tell us that the climate of West Africa is unhealthy, but we know it in an altogether different way if we have fought an attack of malaria. We may hear that there are dishonest people in the world, but it is when we have been cheated that we realize it most fully. A boy is told to be careful when he is dealing with strong sulphuric acid, but a drop on his finger or his clothes will be a more convincing warning. It is not easy to say exactly what the word experience covers, but we may conveniently regard it as covering the

whole range of our actual contact with the world, and the people about us—the impressions they make on us, our responses to those impressions, the reaction to those responses, and so on.

But to learn everything by direct experience would take too long, to say the least of it, even if uncorrected individual experience were always thoroughly reliable. But who has not at one time or other been compelled to correct his first impressions? Thus it would be foolish to give up the enormous advantage we have in our power of learning from the experience of others, to which we naturally resort as an indispensable means of gaining knowledge. We listen to and ask questions of others, or we go to books, whenever we want to know; we imitate; we make inferences; we are insensibly influenced by the attitude of mind of those amongst whom we live.

It is the teacher's first duty to consider and to understand how, and under what circumstances, people, especially children, learn. Broadly speaking, we may say that knowledge is acquired—

1. From the impressions we receive from without.

2. From our own successes and failures in trying to give expression to our ideas and impulses.

Let us consider first the sources of these external impressions, and our attitude towards them. We may distinguish in the first place, all the impressions we consciously accept when we listen to those who are trying to teach us; in the second place, those which are purposely sought, as when we ask questions, make

observations, take experimental risks, and imitate the actions of others; in the third place, those which are forced upon us by circumstances lying outside our control (sometimes things "happen," and impress us with more or less violence, giving us lessons which never lose their effect—the burnt child always dreads the fire—and at other times we are compelled to submit to steady discipline of various kinds, which is prescribed for us by others—ineradicable habits of cleanliness, consideration for others may be fixed in this way—); and, in the fourth place, there are impressions which we assimilate unconsciously, as when we spontaneously assume the manners and modes of speech of those about us, or imbibe current beliefs and prejudices, often without realizing their effect upon us, until a new environment compels us to take stock, as it were, of ourselves and the things we have been taking for granted. Snobbery, for example, may never discover itself until it comes into a liberal atmosphere.

In all these cases we have been considering external impressions as sources of knowledge. At the same time, it is important to realize that the same external happenings produce different effects upon different individuals. The explanation of this must be reserved for the present, though it is a complication which will ever need to be taken into account in the actual practice of the schoolroom.

There remains the second group of experiences referred to above, in which our efforts at giving expression to what we think we know lead us to correct

the errors and fill up the gaps of which we were till then unconscious. Expression may take many different forms, e.g. gesture, play, oral and written speech, music, as well as dramatic, organizing, constructive and thought activities of all kinds. We may think we understand the causes of the tides, but in an attempt to explain them to an inquiring friend, he asks us questions which upset our ideas and lead us to reconstruct them, or, in a vain effort to electrify a piece of damp glass by rubbing it with a silk cloth, we learn that dryness is an essential condition of success, or, as a householder, a man goes to record his vote at an election and discovers an anomaly in the electoral law, by reason of which his name is not on the register.

The teacher is concerned to consider each and all of these modes of learning, and we shall in succeeding sections discuss quite briefly their practical bearings.

His traditional rôle is that of direct instruction. He feels that his first business is to impart knowledge, and of necessity he makes large use of the most direct method, that of Telling, though he soon finds out that this is not the end of the matter. He has still to see that his pupils have learned what he has told them. But Telling includes narration, description, illustration, and explanation, each of which requires special consideration.

EXERCISES.

1. How did you learn:—

(*a*) That all is not gold that glitters?

(*b*) That the prevailing wind in your town is S.W.? (or whatever direction it may be).

(*c*) That a friend in need is a friend indeed?
(*d*) That coltsfoot flowers early in the spring?
(*e*) That August is not the month for bird-nesting?
(*f*) That it is good to sleep with windows open?
(*g*) That the alcohol-habit is the cause of much suffering?
(*h*) That it is right to give way to your elders?
(*i*) That England is the finest country in the world?
(*j*) That 2 and 2 make 4?
(*k*) To raise your hat when you meet a lady?

2. What do these things mean to you, and how did they get their meaning in your mind?—
(*a*) The fascination of London.
(*b*) The delights of country life.
(*c*) Social unrest.
(*d*) A philanthropist.
(*e*) Calcutta.
(*f*) A wasp.
(*g*) A free-kick.
(*h*) A bully-off.
(*i*) Consols are a safe investment.
(*j*) A smart catch in the slips.

3. How does a child learn:—
(*a*) To put on his clothes?
(*b*) To speak with or without a local accent?
(*c*) To carry china cups carefully?
(*d*) To find his way to school?
(*e*) To slide down the banisters?
(*f*) To play cricket?
(*g*) To walk quietly across the schoolroom?
(*h*) To recognize the hoot of a motor-car?
(*i*) To respect his teacher?
(*j*) Social exclusiveness?

4. What should be the attitude of the schoolmaster towards his boys' hobbies? Find out which boys of twelve and upwards in the school have hobbies. Can anything be done to foster some favourite pursuit amongst the boys who have still not found one? How do you account for differences of this kind amongst boys?

CHAPTER II.

WORK AND PLAY.

Your purpose is, indeed, the broad purpose of our civilization. We are seeking to make a childhood of wholesome play lead up to a mature life of wholesome work from which the spirit of play has not been altogether lost.—(E. E. Brown, *Children of the United States.*)

If you look back on your own education, I am sure it will not be the full, vivid, instructive hours of truantry that you regret; you would rather cancel some lack-lustre periods between sleep and waking in the class.—(R. L. Stevenson.)

MR. BROWN, Commissioner of Education for the United States, emphasizes a distinction between work and play, and bases upon it a view of education which it is worth while for the young teacher to consider at the very outset of his career. School time is the playtime of life, and the schoolboy is to emerge from the school ready to take up with steadily increasing seriousness of purpose a life of wholesome work, but the spirit of play is not to go altogether. The working man must have some of the play left in him.

What is the distinction between the spirit of work and the spirit of play? Current use of the words makes

it difficult to draw a very clear line of demarcation. We teach a boy to play the violin for his pleasure, the professional plays cricket for a livelihood. No lady would call knitting a game, though she would play at patience; and strenuous as is chess, it is always a game. Boys do not play in the gymnasium, though they do in the football field; they work at their Latin and play the piano. The distinction cannot lie in the effort called forth, for few boys fail to put more effort into football than they ever think of giving to their lessons, whether the subject be mathematics or carpentry. Nor does the difference lie in the seriousness of the undertaking. It matters not how much depends upon the result, a man still plays his game of chess, and the professional pianist "plays" for his audience, however large his fee.

In spite of the apparent confusion in our ordinary usage of the terms, the distinction seems to be a rough expression of a psychological difference which the popular mind appreciates, at any rate partially. Play is a wholehearted affair always—or we deny that the boy or the man is really playing; work has the appearance of being forced upon us by circumstances, and we take it up with such good grace as we can. When we play, we do it out of love for the business—even the professional football player is so by his own choice—our whole self goes into it; we are and we feel ourselves to be completely identified with the object of the game. We enjoy it therefore. The student may object that this does not apply to the pupil's early efforts to play

the violin, to which, of course, we might answer that he is only learning to play. Once the technical difficulties are overcome, his heart will get into his instrument, and he will thoroughly enjoy himself whenever he takes it up.

But we cannot insist rigidly upon this as a necessary distinction between work and play, for many would urge, very properly, that the spirit of work and of play seem to differ in a much more important respect than that which we have suggested. When we are at play the joyousness of it comes from the complete absence of responsibility. This is, of course, very often true, but no member of a football team would accept such a view of the matter. In the more developed forms of play, at any rate, there is a very considerable measure of responsibility, and, in a certain sense, it is this responsibility itself which gives a piquancy to the whole situation, and adds to its attractiveness. We may also add that many people enjoy their work, and find opportunities in it for expressing themselves in a much more perfect and worthy way than they can in playing golf.

Thus whenever we try to reduce the difference between those occupations men call *work* and those which they call *play*, to exact expression, we find the utmost confusion reigns and that no fixed line of demarcation can be drawn. May it not be that, under ideal conditions, all distinction would vanish, so far at least as it was based upon the relative enjoyment of the one when compared with the other? (We might,

of course, continue to use the words to distinguish the more from the less serious occupations of life, and one man's play would be another man's work, as, indeed, is frequently the case now.) But this is precisely the position with the very small child, whose whole soul goes out into whatever he is engaged upon. We cannot distinguish his work from his play.

The period of immaturity is the period of play in every form of animal life. The playfulness of the puppy and the kitten never ceases to charm, and we have all remarked on the skittish frivolities of sober sheep and cattle in the halcyon days of their infancy. Once a little child can trot about and prattle, his playful activities never cease. At first, he just runs hither and thither, laughs and shouts, throws his toys about as if in sheer enjoyment of the movement. What he does has no apparent purpose; he just follows a blind impulse to put his muscles to use. Try to teach the three-year-old child a game; he may enter into your proposals for a very short time, though he soon grows impatient of your restrictions. Make-believe, in particular, attracts him, though make-believe is not the beginning of purposeful action. He has already mastered the art of feeding himself, he can fetch and carry in an irresponsible sort of way, but he shows a love of make-believe very early. The impulse to imitate takes powerful hold upon him. He will do all sorts of things which he sees his parents doing without in the least understanding why. He will "write a letter" long before he has any idea of what "letter"

means, and he will "read a book" in entire ignorance of what reading is. This is not "make-believe"; it is for the child the real thing.

The characteristic feature of play is self-abandonment. In its purest form there is often complete absence of purpose in the movement it entails. As children grow older they introduce imitative action into their play, but, at first, this is very changeful and temporary. A child does not like to be the same thing for long. Minor parts are particularly objectionable to him.

In spite of its want of organization, young children's play is of the greatest importance in the development of their minds as well as of their bodies. They learn, of course, to control and adapt their movements to particular ends; they get their first lessons in co-operative activity in the ring games of the nursery and the kindergarten; they discover themselves in their imitative occupations; in just doing what they see their elders do, they find out what they themselves are capable of, and thus their sense of personal power grows. As they grow older the co-operative idea takes a stronger hold, and their plays become organized into games in which purposes are more remote, where co-operation is essential to success, where failure is possible in spite of that, where chivalrous good temper under all circumstances is the mark of good form. All this is of the greatest possible value, and there are very few schoolboys or schoolgirls who are incapable of entering into activities of the kind with the utmost possible zest.

The contrast between the spirit of school play and the spirit of school work is so great that a more or less well-accredited story gives the credit of the victory at Waterloo to the playing fields of Eton, and there are many parents who would choose their boy's school by its successes in cricket and football, rather than by its successes in examinations. This is not altogether due to the lighthearted thoughtlessness of parents, and, in any case, the fact is a powerful criticism of what is commonly regarded as the serious side of school life. Play has not risen to so commanding a position in the primary schools; teachers, however, are beginning to realize not only its intrinsic value, but also how much may be learned from it in respect of school work.

In the very best of our schools the sense of relief when play time comes is sufficiently marked to strike the most casual observer. The spirit of self-abandonment which distinguishes the child at play is commonly lost when he is in school. Why? When he is playing, he is doing things he cares about, and he will take endless pains to do them well; when he is in school, we commonly forget the necessity of securing the goodwill of the boys, in the best sense of that word. They may "willingly" listen to our lessons, and work the related exercises as we direct them, but if the teacher leaves the room, they commonly relapse into pleasanter activities. Even when "discipline" is stern enough to prevent this, what the children are doing is external to them; it is forced upon them from without; they conform, more or less cheerfully, to the necessities

of the situation. If we ask them what they are doing, and why, they will tell us it is because they have to, or because their teacher wishes it, or they may vaguely say that they are learning things that will be useful to them later on. Only in the rarest cases is it just the thing they would of all things rather be doing. There the whole difficulty lies. We want children at school to be doing the things which have a meaning for them then, and which they feel have to be done at that moment. In their play the older boys and girls accept the rules of the game loyally, and within the limits thus laid down they exert themselves keenly to accomplish the aim of their team. The game gives abundant opportunity for individual excellence to assert itself, but the co-operative spirit is its dominant feature. The school lesson commonly neglects the stimulus of co-operative activity. We rigorously forbid our pupils to help each other, and take measures to make it impossible. This is artificial, and most healthy-minded boys do not understand it, unless their views are warped by the attitude which makes mutual helpfulness a school crime.

It is unnatural to dislike work, if by work we are to understand all those activities which are connected with serious purpose. Nevertheless, it is one of the unfortunate features in the modern organization of industry, that it produces such a large number who do not enjoy their work. It is a means of livelihood, and nothing more. Even at school many have never learned that work can be a great source of pleasure.

The idea is not difficult to implant. It will come partly from the joy we show in our work as teachers; it will never come by *telling* the children that they *ought* to take a pride in what they are doing. But most of all it will come from our skill in so arranging the activities of our pupils that every child sees the point he is making for, and the propriety of getting there himself, and doing all he can to help the others to get there also. Even those tedious exercises which are essential in the acquisition of technique will be gladly gone through if he has realized the immediate advantage which mastery of technique will bring. He will assiduously practice boating, or "shooting" a ball at the goal, in order to qualify himself for the school team, and if we can lead him to see his school work in the same light, we shall find him equally eager to achieve the necessary technical skill.

The moral of all this is, that the teacher must look upon his class as an assembly of persons, each of whom has a peculiar delight in carrying through his own plans, and is hardly less ready to engage with others in accomplishing some common end. On the other hand, they are all much less constant in doing the things which are forced upon them, often without recognizable reason. It is easy enough to "discipline" a class into meaningless activities, but we have only to compare the dull "compositions" of the ordinary schoolboy with the liveliness of his out-of-school oral communications to realize how much is lost when formally faultless work is done under the force of

necessity. The outward and visible signs of resistance are not present in the classroom; the mind machine is working with all possible smoothness, but it is just a machine producing mechanical results.

In their play, the boys take care of themselves, set their own exercises, are their own disciplinarians, accepting freely the rules of the game, and—at least, in very large measure—they are their own instructors. In school, the teacher takes care of them, puts them under rules, gives them their lessons and provides the exercises. They are under constraint all the time. It is therefore not surprising that they hail the time of freedom with joy, for then they can be themselves again. Can something not be done in the direction of helping our pupils to be themselves when they are in the classroom? We must not, of course, abandon the seriousness of purpose which belongs to school work proper. Nor on the other hand must we look for long-continued attention to the same purpose in little children, but, as they advance in the school, their power to work for relatively remote ends increases. We suggest therefore that the teacher should always consider how far it is possible to win his class to the point of view which makes them work, as they play, in the spirit of good comradeship, and towards an end into the idea of which they can enter with the joy of anticipation.[1]

[1] The student will find some admirable examples of co-operative work described in C. A. Scott's *Social Education* (Ginn & Co.).

EXERCISES.

1. Why do you play football, or hockey, or cricket? Is it re-creative activity, or is it an outlet for unspent energy? Compare your attitude towards these games with that of a small boy who plays all day long.

2. Watch a group of children in the kindergarten playing such a game as

"Little doves, you darling things,
Come spread out your pretty wings;
Fly out in the open air, food in plenty everywhere,
Coo-oo-oo-oo-oo, Coo-oo-oo-oo;"

and compare the same children playing

"I have something in my hand,
Can you guess what it may be?
But I hope you understand,
You may feel (smell) but must not see."

Which do they enjoy most? Why?

3. What is your most absorbing intellectual activity? How did you acquire your zeal?

4. Should a boy who helps another to do his arithmetic, or one who copies the work of another, be punished? Give reasons for your answer.

5. Watch a child of four and a child of ten in the playground with other children. Describe carefully how they employ themselves. What broad distinctions do you notice?

6. What is the difference in the mental attitude of children at drill and at play?

7. It is often said that the product of the small village school, where one teacher has several classes in his charge, is better than that of the highly organized city school. Assuming the truth of this statement, what may be the reason?

8. Do you know any instance of co-operative work at school? Describe it carefully.

9. It has sometimes been said that a child is the best person to teach a child. What truth may there be in this?

10. "Think!" "You are not thinking!" Note the frequency of this type of stimulus in the lessons you may hear. Estimate their effectiveness. Collect other examples, and say why they are so often used. Suggest a remedy.

11. Read carefully and critically Tolstoy's account of his school at Yásnaya Polyána.

12. Why did Frobel call "play" the loftiest phase of childhood?

13. "The feeling of power is for every child a greater reward and a greater joy than any of the rewards and decorations which men devise for his encouragement in learning Yet in the child no use is made of it; we find instead the most pitiable and unnatural substitutes employed. At best they only make the child tolerate that which their teachers wish to cram into them" (Pestalozzi, *Christopher and Elizabeth*). Is there any truth in this as applied to our schools to-day? Be as specific as possible in your answer.

14. Wherein lies the difference between work and play to the boy who plays hard, works hard, and enjoys both? Does such a boy need play?

CHAPTER III.

NARRATION.

What then is the education to be? Perhaps we could hardly find a better than that which the experience of the past has already discovered, which consists, I believe, in gymnastic for the body, and music for the mind.

It does.

Shall we not then begin our course of education with music rather than with gymnastic?

Undoubtedly we shall.

Under the term music, do you include narratives, or not?

I do.

And of narratives, there are two kinds, the true and the false.

Yes.

And must we instruct our pupils in both, but in the false first?

I do not understand what you mean.

Do you not understand that we begin with children by telling them fables? And these, I suppose, to speak generally, are false though they contain some truths; and we employ such fables in the treatment of children at an earlier period than gymnastic exercises.—(Plato's *Republic*, Davies and Vaughan's translation, Bk. II. pp. 376-7.)

And it shall come to pass, when your children shall say unto you, What mean ye by this service?

That ye shall say, It is the sacrifice of the Lord's passover, who passed over the houses of the children of Egypt, when he smote the Egyptians, and destroyed their houses.—(Exod. XII. 26-27.)

That this may be a sign among you, that when your children ask their fathers in time to come, saying, What mean ye by these stones?

Then ye shall answer them, That the waters of Jordan were cut off before the ark of the covenant of the Lord . . .—(Josh. IV. 6-7.)

TELLING stories is perhaps the oldest of all our instruments of formal education. So important was it considered in Hellas that Plato in the *Republic* discusses at length the ethics of story telling. There seems to be little doubt that children while in the nursery learnt the various current fables and ballads and myths of ancient Greece. Certainly, the fables of Æsop were as popular then as now. The great epics, the Odyssey and the Iliad, were learnt almost by heart in the schools, while the rhapsodes might be heard at Athens declaiming Homer nearly every day.[1] It is reported of the rhapsode Ion, that when he recited Homer, his eyes filled with water, and his hair stood on end, so keenly did he enter into the spirit of the story, and his audience were in much the same condition.[2]

[1] *Cf.* Freeman, *Schools of Hellas.*
[2] *V.* Freeman, *op. cit.* p. 248.

As will be gathered from the extracts at the beginning of the chapter, story telling was the favourite means of inculcating moral and religious ideas, instilling patriotism, and maintaining national traditions, and although we are less dependent upon simple narration than our predecessors before the days of printed books, it remains true that story telling is of primary importance in education, and the power to tell a story well might not unfittingly be regarded as an essential qualification of the teacher. Let us then study the subject of narration more closely.

We all know by experience how much easier it is to tell a story or to relate what happened on some particular occasion than it is to describe the dress and appearance of the people we meet with. This is because in narration we are recounting a series of events that naturally unfold themselves in time—we are following a simple "cause and effect" order—everything is in sequence; the time periods of our narrative correspond to the time periods in the actual occurrence. The consequence of breaking such an order is seen in the mental confusion that results, when we adopt a cart-before-the-horse method of telling a story when the listener does not get a clue in the right place, when we leave out an incident and go back on ourselves, or when we break the thread of the narrative to introduce side issues. Miss Matty's conversation in *Cranford* owes much of its charm to this sort of thing, but children would have found it difficult to follow her.

"What went wrong at last?" said I. "That tiresome Latin, I dare say."

"No, it was not the Latin. Peter was in high favour with my father, for he worked up well for him. But he seemed to think that the Cranford people might be joked about and made fun of, and they did not like it; nobody does. He was always hoaxing him; 'hoaxing' is not a pretty word, my dear, and I hope you won't tell your father I used it, for I should not like him to think that I was not choice in my language, after living with such a woman as Deborah. And be sure you never use it yourself. I don't know how it slipped out of my mouth, except it was that I was thinking of Peter, and it was always his expression. But he was a very gentlemanly boy in many ways. He was like dear Captain Brown in always being ready to help any old person or a child. Still, he did like joking, and making fun: and he seemed to think the old ladies in Cranford would believe anything. There were many old ladies living there then; we are principally ladies now, I know, but we are not so old as the ladies used to be when I was a girl. I could laugh to think of some of Peter's jokes. No, my dear, I won't tell you of them, because they might not shock you as they ought to do, and they were very shocking. He even took in my father once, by dressing himself as a lady. . . ."[1]

We may produce a similar blurred effect by overloading a story with detail. Everything, of course, depends upon the choice and purpose of it. If it is there simply from a desire to leave nothing out, it may easily be fatal to success, but if it is there to com-

[1] *Cranford*, ch. VI.

plete an effect, minutiæ may be most telling. Sam Weller's account of his father's doings at election times loses nothing from the abundance of detail with which it is given.

"Not half so strange as a miraculous circumstance as happened to my own father, at an election time, in this werry place, sir," replied Sam.

"What was that?" inquired Mr. Pickwick.

"Why, he drove a coach down here once," said Sam; "'lection time came on, and he was engaged by vun party to bring down voters from London. Night afore he was a going to drive up, committee on t'other side sends for him quietly, and away he goes with the messanger, who shows him in;—large room—lots of gen'l'm'n—heaps of papers, pens, and ink, and all that 'ere. 'Ah, Mr. Weller,' says the gen'l'm'n in the chair, 'glad to see you, sir; how are you?' —'Werry well, thank'ee, sir,' says my father; 'I hope you're pretty middlin',' says he.—'Pretty well, thank'ee, sir,' says the gen'l'm'n; 'sit down, Mr. Weller—pray sit down, sir.' So my father sits down, and he and the gen'l'm'n looks werry hard at each other. 'You don't remember me?' says the gen'l'm'n.—'Can't say I do,' says my father. . . ."[1]

The student may now compare the following passages which illustrate the various styles of narrative suited to their particular subject-matter, and to the audience to which they are addressed. Thus from *The Three Bears*:—

One was a little small wee bear, and one was a middle-sized bear, and the other was a great huge bear. They had

[1] Dickens, *Pickwick Papers*, ch. XIII.

each a pot for their porridge,—a little pot for the little small wee bear, and a middle-sized pot for the middle-sized bear, and a great pot for the great huge bear. And they had each a chair to sit in,—a little chair for the little small wee bear . . .

In this he will notice the use made of repetition, and the very sparing use of description, just enough to heighten the dramatic effect of the incident. It is typical of narrative suited to very young children.

Compare this extract from Mr. Rudyard Kipling's story of *Old Man Kangaroo* :—

Not always was the Kangaroo as now we do behold him, but a different animal with four short legs. He was grey, and he was woolly, and his pride was inordinate; he danced in the middle of Australia, and he went to the Little God Nqa.

He went to Nqa at six before breakfast, saying, "Make me different from all other animals by five this afternoon". Up jumped Nqa from his seat on the sand . . . and shouted "Go away!" He was grey, and he was woolly, and his pride was inordinate; he danced on a rock-ledge in the middle of Australia, and he went to the Middle God Nquing.

He went to Nquing at eight after breakfast, saying . . .

He went to Ngong at ten before dinner time, saying, "Make me different from all other animals; make me popular and wonderfully run after by five this afternoon". . . . His request was granted.

He ran through the desert; he ran through the mountains; he ran through the salt pans; he ran through the reed-beds . . .

He hopped through the Flinders; he hopped through the Cinders; . . he hopped like a Kangaroo. . . .

Here again we have an admirable example of the use of repetition. In this case, however, description plays a more prominent part, though it is still quite subordinate to the incident in the story. Compare, for these same features, Browning's *Pied Piper* and some of the stories in *Hiawatha.*

By way of contrast, we may now examine a paragraph from *Rip Van Winkle:*—

As he was about to descend, he heard a voice from a distance, hallooing, "Rip Van Winkle! Rip Van Winkle!" He looked around, but could see nothing but a crow winging its solitary flight across the mountain. He thought his fancy must have deceived him, and turned again to descend, when he heard the same cry ring through the still evening air: "Rip Van Winkle! Rip Van Winkle!"—at the same time Wolf (his dog) bristled up his back, and giving a low growl, skulked to his master's side, looking fearfully down into the glen. Rip now felt a vague apprehension stealing over him; he looked anxiously in the same direction, and perceived a strange figure slowly toiling up the rocks, and bending under the weight of something he carried on his back. . . . On nearer approach he was still more surprised at the singularity of the stranger's appearance. He was a short, square-built old fellow, with thick bushy hair and a grizzled head. His dress was of the antique Dutch fashion—a cloth jerkin, strapped round the waist—several pairs of breeches, the outer one of ample volume, decorated with rows of buttons down the sides, and bunches at the knees.

Description in this case is woven into the very fibre of the narrative. It gives feeling and atmosphere to the whole story, with the slow movement of which

compare the following account of Mohammed's first battle encounter with his unbelieving neighbours :—

After a short debate, he sacrificed the prospect of wealth to the pursuit of glory and revenge; and a slight intrenchment was formed to cover his troops by a stream of fresh water that glided through the valley. "O God," he exclaimed, as the numbers of the Koreish descended from the hills, "O God, if these are destroyed, by whom wilt thou be worshipped on the earth?—Courage, my children; close your ranks; discharge your arrows, and the day is your own." At these words he placed himself, with Abuleker, on a throne or pulpit, and instantly demanded the succour of Gabriel and three thousand angels. His eye was fixed on the field of battle; the Musulmans fainted and were pressed; in that decisive moment the prophet started from his throne, mounted his horse, and cast a handful of sand into the air: "Let their faces be covered with confusion". Both armies heard the thunder of his voice; their fancy beheld the angelic warriors; the Koreish trembled and fled; seventy of the bravest were slain; and seventy captives adorned the first victory of the faithful.—(Gibbon's *The Decline and Fall of the Roman Empire*, Vol. V. ch. L. p. 362.)

It will be clear that narrative may vary very greatly in the form it takes, and that the form we choose must be appropriate to the particular story and to the occasion. There must be a clear thread running throughout, and detail, both narrative and descriptive, so carefully selected as to convey the impression the narrator himself has got. The story teller is an artist who interprets an incident for himself, and conveys his own interpretation to his audience. According to his

interpretation, the narrative will move rapidly or slowly, there will develop in it the clash of arms and the rapid rushes of attacking forces, or the uncanny silence that quickens the heart beat. An atmosphere of mirth or sadness, of urbanity or savagery can be created according to his fancy. The first and last lesson the raconteur has to learn is to gauge his audience, and having done that, to live through his own story.

The problem of the choice of stories for children can only be dealt with in outline. Certain principles of fundamental importance can be laid down which, if grasped, will leave the teacher free to select whatever stories he may think fit.

All children love stories, and story telling is one of the most effective means of winning their regard, and, moreover, rightly chosen, the well-told story has a high educative value.

A good story never wearies young children. They love to hear again and again what their old "story friends" did and said. If our stories will not bear repetition, they are not well chosen. Up to six, or thereabouts, a jingling verbal repetition especially pleases children—they love to anticipate their teacher, and fill in the well-known words which mark particular situations. Simplicity of plot and scene is all-essential. Nursery rhymes, simple fairy stories in which the good is rewarded and evil meets adequate punishment, fables and Bible stories, will form the chief sources of material, while some modern writers like Lewis Carroll, Mr.

Kipling and Miss Beatrice Potter have given enormous pleasure to children of the nursery age and over.

Simplicity of motive and decisiveness of action must also mark the stories we tell to older children. Subtleties which appeal to the adult are lost upon them. They love the full-blooded hero, who braves enormous dangers and accomplishes fine feats of daring in unhesitating sequences. Children are not usually reflective and hesitant in their own activities—they cannot sympathize with those who sit down and think. As they advance in the school, we may use the story, e.g. in the history lesson, to make clear the need for thought before action, but this is a side issue, and we may easily spoil the story by thinking too much upon its moral.

Having chosen the story, the first essential is to enter into the spirit of it, and adapt it to the needs of the particular class. The story teller manifests his skill by judicious omissions and additions calculated to bring the narrative within the reach of his audience. Thus, his characters will or will not speak for themselves, according to the age of the class or the dramatic impression he wishes to convey. Unless all thought of self is lost in the sheer delight of the story, the teacher will not be more than half-successful. It must bear the impress of his own joy. Next, it is necessary to speak slowly and clearly, taking up such a position that all can hear and see, without strain of any kind. If the young teacher knows the story, and has told it several times aloud in the privacy of his own room—

this will not of course be necessary when he has grown familiar with his new position--and if the story has got hold of him, there will be no fear of being dull in the telling. Dramatic he must be, but that will come quite naturally when the story has really possessed him. He must beware of trying to produce dramatic effects which he does not feel.

In those circumstances the teacher will not fall into the mistake of breaking up the story into an untold number of parts in order to ask questions, and to see whether his class is following. Such a procedure is fatal to the success of the story as something to be enjoyed, and, please note, any result—moral or literary—which we may hope to produce in the minds of our pupils, depends primarily upon their enjoyment. It must touch their feelings, if it is to have results which go beyond the mere events and persons it embodies. The whole story is to be given in its unbroken sequence. If it is very long, it may conveniently divide into shorter chapters more or less complete in themselves; these will be told and summed up in their order before going on to the next. A long story which cannot be broken into parts is unsuited for narration, and should be left until the children can read it for themselves.

As a rule, the detail of a story will vary with the children for whom it is intended, and with our particular object in telling it. We may, for example, wish to tell the story of the coming of the Normans in such a way as to bring out the social and other differences between the Saxons and the Normans, or to make

special point of the military aspect of the conquest, or to contrast the personal qualities of Harold and William. We shall need to consider with every story just what special feature we wish to stand out prominently, and, in order to attain our object, we must not feebly resort to a "Now I want you to notice this," or "What I am going to tell you now is very important," or "I shall put that on the blackboard". The emphasis will come from the accumulation and arrangement of detail.

At the same time, we must not insist upon the children taking hold of all the detail just as we give it. If they have caught the main drift, they will take up the minor points which interest them, as we do when we read a novel. If the resulting expression is not quite what we hoped, tell the story again another and still another time. Gradually, sufficient significant detail will shape itself in their minds.

The temptation to stop the story in order to call an apparently inattentive boy to book should be resisted. If the class as a whole is with the teacher, probably he also is listening; presently the teacher will catch the boy's eye, and his glance will prevent any serious lapse. The teacher will find out later whether he has been attending.

To avoid misunderstanding and the necessity for questions from an intelligent but puzzled child, it may be necessary to introduce the story by a short preliminary talk about the circumstances in the midst of which it is set. It would be foolish to tell stories of

the knights of chivalry unless the class knew something of armour and tournaments, of castles and drawbridges, of shields and coats of arms, of sacred vows and knightly quests. Precise scholarly knowledge is of course not meant, but if we do not in some way help our pupils to picture scenes in which the accessories of modern life are absent, they will inevitably put these in, to the utter confusion of the story.

The choice of the story will, of course, be largely determined by the number of difficulties of this kind which it involves.

EXERCISES.

Consider the following stories with reference to—

(*a*) The class for which they are suitable.

(*b*) The nature of your introductory talk (if any).

(*c*) What modification the story would need if told

(i) to a junior class (children of 6),

(ii) to a class of children aged 11.

(*d*) Whether it should be in your own words or in those of some classical text, or partly in one and partly in the other.

(*e*) Whether it needs subdivision, and how you would subdivide it.

(*f*) From what different points of view it would be possible to tell the story, and what modification in treatment these would involve.

(1) The Fall of Troy.

(2) Joseph and his brethren.

(3) Cinderella.

(4) The Golden Fleece.

(5) Little Red Riding Hood.

(6) The Ugly Duckling.
(7) Sohrab and Rustum.
(8) The Holy Grail.
(9) The Story of Baldur.
(10) The Siege of Calais.
(11) Snow White.
(12) Œdipus and the Sphinx.
(13) Sigurd the Volsung.
(14) David and Goliath.
(15) Sindbad the Sailor.
(16) Aladdin.
(17) Una and the Red Cross Knight.
(18) Macbeth.
(19) The Story of Shylock.
(20) Beowulf.
(21) Leonidas.
(22) St. George and the Dragon.
(23) The Fox and the Grapes.
(24) The King of the Golden River (Ruskin).
(25) Rikitikitavi.

CHAPTER IV.

DESCRIPTION.

BEFORE attempting any discussion of the place and use of description in teaching, it will be well to consider some examples of its uses, with a view to finding out what purposes it serves, and the causes of success and failure.

We must remember that young children, left to themselves, make very little use of description at any time. Two extracts from their stories as transcribed by Jas. Whitcomb Riley in *A Child-World* will illustrate this.

The Bear Story:—

W'y, wunst they wuz a Little Boy went out
In the woods to shoot a Bear. So, he went out
'Way in the grea'-big woods—he did. An' he
Wuz goin' along—an' goin' along, you know,
An' purty soon he heerd somepin' go "*Wooh!*"—
Ist that-a-way—"*Woo-ooh!*" An' he wuz *skeered*,
He wuz. An' so he runned an' clumbed a tree—
A grea'-big tree, he did,—a sicka-*more* tree,
An' nen he heerd it ag'in; an' he look round,
An' '*t'uz a Bear!—a grea'-big shore-nuff Bear!*—
No: 't'uz *two* Bears, it wuz—two grea'-big Bears—

The story goes on to tell how the boy shot one bear, the cub, and the big bear climbed the tree after him. He explains that bears can climb trees.

. . . . . .

An' so here come the grea'-big Bear, he did—
A-climbin' up—an' up the tree, to git
The Little Boy an' eat him up! An' so
The Little Boy he clumbed on higher, an' higher,
An' higher up the tree—an' higher—an' higher—
An' higher'n iss-here *house* is!—An' here come
Th' old Bear—clos'ter to him all the time!—

He had no second charge in the gun to shoot the bear with, so

Th' Little Boy clumbed *higher* up he did—
He clumbed *lots* higher—an' on up *higher*—an' higher
An' *higher*—tel he ist *can't* climb no higher,
'Cause nen the limbs 'uz all so little, 'way
Up in the tenny-weeny tip-top of
The tree—etc. etc.

Here we have a typical child's narrative, vigorous and full of repetition, with very little description—there is just a *great big* tree, a *little* boy, and a *great big real* bear.

Let us compare this with the following:—

Story of Red Riding Hood:—

W'y, one time wuz a little-weenty dirl,
An' she wuz named Red Riding Hood, 'cause her—
Her *Ma* she maked a little red cloak fer her
'At turnt up over her head—An' it 'uz all
Ist one piece o' red cardinal 'at's like

The drate-long stockin's the store-keepers has,—
O! it 'uz purtiest cloak in all the world
An' *all* this town er anywheres they is!
An' so, one day, her Ma she put it on
Red Riding Hood . . . etc.

And she set out to her Grandmother's at the other side of the wood.

So when Red Riding Hood
She dit to do there, allus have most fun—
. . . . . .
An' so she sees the little hoppty-birds
'At's in the trees, an' flying all around,
An' singin' dlad as ef their parunts said
They'll take 'em to the magic-lantern show!
An' she 'ud pull the purty flowers an' things
A'growin' round the stumps—an' she 'ud ketch
The purty butterflies, an' drass-hoppers . . . etc.

Here there is more description. We may note in particular, the picture of the little girl in the first few lines; her cloak is the striking thing about her, and it receives quite special attention—indeed the cloak is all. Note, too, the use the child makes of comparison. The hood of the cloak is like the familiar long stockings of the drapers' shops, the joy of the birds is like his own joy when his parents promise to take him to the show. Apart from this, we learn what the wood is like by hearing how Red Riding Hood amused herself in going through it. There is no attempt to make an orderly picture. The description takes a narrative form, and is full of movement.

We see the same sort of thing in *Alice in Wonderland*:—

Alice was not a bit hurt, and she jumped up on to her feet in a moment; she looked up, but it was all dark overhead; before her was another long passage, and the White Rabbit was still in sight, hurrying down it. There was not a moment to be lost: away went Alice like the wind, and was just in time to hear it say, as it turned a corner, "Oh my ears and whiskers, how late it's getting!" She was close behind it when she turned the corner, but the Rabbit was no longer to be seen: she found herself in a long, low hall, which was lit up by a row of lamps hanging from the roof.

There were doors all round the hall, but they were all locked; and when Alice had been all the way down one side and up the other, trying every door, she walked sadly down the middle, wondering how she was ever to get out again.

Suddenly she came upon a little three-legged table, all made of solid glass: there was nothing on it but a tiny golden key, and Alice's first idea was that this might belong to one of the doors of the hall, but, alas! either the locks were too large or the key was too small, but, at any rate, it would not open any of them. However, on the second time round, she came upon a low curtain she had not noticed before, and behind it was a little door about fifteen inches high: she tried the little golden key in the lock, and to her great delight it fitted!

Alice opened the door, and found that it led into a small passage, not much larger than a rat-hole: . . .

The narrative does not stop in order that we may hear what the passage and the great hall are like: as the story of Alice's doings goes on, we get detail after

detail, and we are left with a very clear picture in our minds at the end. No constructive effort has been called for, and a child can follow it. Even the glass table is not elaborated—it is in itself striking enough to hold the attention: more detail would have spoiled the effect.

What is meant by over-elaboration will be understood after reading the following extract from *The Mabinogion*:—

And the youth pricked forth upon a steed with head dappled grey, of four winters old, firm of limb, with shell-formed hoofs, having a bridle of linked gold on his head, and upon him a saddle of costly gold. And in the youth's hand were two spears of silver, sharp, well-tempered, headed with steel, three ells in length, of an edge to wound the wind, and cause blood to flow, and swifter than the fall of the dewdrops from the blade of reed grass upon the earth when the dew of June is at the heaviest. A gold-hilted sword was upon his thigh, the blade of which was of gold, bearing a cross of inlaid gold of the hue of the lightning of heaven; his war-horn was of ivory.

. . . . . .

About him was a four-cornered cloth of purple, and an apple of gold was at each corner, and every one of the apples was of the value of an hundred kine. And there was precious gold of the value of three hundred kine upon his shoes, and upon his stirrups from his knee to the tip of his toe. And the blade of grass bent not beneath him, so light was his courser's tread as he journeyed towards the gate of Arthur's Palace.

The over-elaboration of detail baffles all our attempts

to build up a picture of the youth. Instead of that we have in our minds a series of disconnected fragments, each attractive enough in itself to take away our interest from the central figure, and destroy the unity of the total effect. We jump from horse to spear, from spear to swords, from swords to cloak, and from cloak to shoes in the oddest way, and we forget all about the youth himself—it is as if his properties were spread out in a museum. In this respect compare Washington Irving's description of the English stage coachman :—

He has commonly a broad, full face, curiously mottled with red, as if the blood had been forced by hard feeding into every vessel of the skin ; he is swelled into jolly dimensions by frequent potations of malt liquors, and his bulk is still further increased by a multiplicity of coats, in which he is buried like a cauliflower, the upper one reaching to his heels. He wears a broad-brimmed, low-crowned hat ; a huge roll of coloured handkerchief about his neck, knowingly knotted and tucked in at the bosom ; and has in summer time a large bouquet of flowers in his button-hole. . . . His waistcoat is commonly of some bright colour, striped, and his small clothes extend far below the knees to meet a pair of jockey-boots which reach about half-way up his legs.

The effect is altogether different although there is no lack of detail, but the relation of the detail to the whole figure is never lost sight of. There is no suggestion of a museum collection about it. We are told first of the broad general effect of his appearance, and this is filled in with just those details which help to

characterize the man, adding to our interest in him, rather than taking it away even for a moment. The detail is precise enough for us to picture him in our mind's eye. Had we the technical skill we could paint his portrait. We could hardly say this of Peredur's lady in the next passage:—

And Peredur was certain that he had never seen another of so fair an aspect as the chief of the maidens. And she had an old garment of satin upon her, which had once been handsome, but was then so tattered that her skin could be seen through it. And whiter was her skin than the bloom of crystal, and her hair and her eyebrows were blacker than jet, and on her cheeks were two red spots, redder than whatever is reddest.

Here the description is too slight—white skin, black hair and eyebrows, hectic cheeks might serve to guide a caricaturist, but no idea of the lady as a person can be got from it.

And now let us turn to description of another kind, such, for example, as a teacher might often use in a geography lesson. Robert Louis Stevenson is describing the desert of Wyoming:—

To cross such a plain (the plain of Nebraska) is to grow homesick for mountains. I longed for the Black Hills of Wyoming, which I knew we were soon to enter, like an ice-bound whaler for the spring. Alas! and it was a worse country than the other. All Sunday and Monday we travelled through these sad mountains, and over the main ridges of the Rockies, which is a fair match to them for misery of aspect. Hour after hour it was the same unhomely

and unkindly world about our onward path; tumbled boulders, cliffs that drearily imitate the shape of monuments and fortifications—how drearily, how tamely, none can tell who has not seen them: not a tree, not a patch of sward, not one shapely or commanding mountain form; sage bush, eternal sage bush; over all, the same weariful and gloomy colouring, grays warming into brown, grays darkening towards black; and for sole sign of life here and there a few fleeing antelopes; here and there, but at incredible intervals, a creek running in a cañon. The plains have a grandeur of their own; but here there is nothing but a contorted smallness. Except for the air, which was light and stimulating, there was not one good circumstance in that God-forsaken land.

Here again, as in the child's description of the wood, and as in the selection from *Alice in Wonderland*, the success of the description is due largely to the narrative and personal form which it takes. We are made to *feel* what those desolate Wyoming Mountains are like, and yet there is no vagueness; the writer does not confine himself to epithets like sad, gloomy, weariful, which by themselves would give no particular picture; actual colour and form are given, to account, as it were, for these emotional epithets.

The examples we have given will illustrate at once the purpose of description and the conditions of success, and, in the first of them, we had a good example of the weakness of childish effort in this direction. In so far as we must often deal with things that lie outside the actual experience of children, we must fre-

quently make use of description. By its means we can lead them to imagine objects, scenes, modes of life, processes, etc., such as they cannot have seen; we can, that is to say, give them a lively sense of a larger world, and prepare the way for an intelligent interest in its problems.

But we cannot bring home to their minds what is strange and unfamiliar except by making use of the things they already know, and it is important to remember that what we know is not always the same as what another knows. In the case of grown-up people, this difficulty is often the ruin of what was intended to be a popular lecture, but the difficulty is greatly increased when we are dealing with children.

In the first place, their range of experience is very limited, and what is well known to us may be completely strange to them. It is essential, therefore, that we should consider carefully the actual content of our pupils' minds. We shall often be surprised at their ignorance. With all the goodwill in the world, they will misapprehend and misinterpret unless we put our points in terms they can understand. And in the second place, they do not care for description for its own sake. Just so much as will give a setting of reality to the story, just enough to enable them to understand the significant features of the object, is all that they can appreciate.

Children have, moreover, very little power of fitting together a complex of parts into a whole. We must, therefore, be careful to keep that whole steadily in

their minds — to give it a meaning and an individuality before we put in details. Thus, when we have given the class some idea of what the Nile means to Egypt, we may properly describe its course, the towns on its banks, and so on ; when they have first got a feeling for the mighty river, they will be ready to appreciate a limited number of details chosen with a view to filling in their first idea, rather than from the point of view of completeness. The opposite procedure is mistaken because there is, as it were, no large conception to act as a sort of framework for the details ; they float loosely in their minds, and drop away altogether in a very short time, unless by constant reiteration they secure a more permanent abiding place, as isolated facts about the Nile.

Similarly, if it is some strange object—a boomerang, shall we say—that we are describing, we should begin by telling of its use, then will follow details of its form and substance in so far as they will help to make clear the purpose it serves and the circumstances of the people who use it. A series of details which have no obvious connexion with a central idea are not, strictly speaking, descriptive. Under such circumstances, the more interesting they are in themselves, the more certain will be their isolation. The teacher will find, too, that children's attention will wander as soon as the details of his description are either not intrinsically interesting or do not illuminate their ideas of the object with which he is concerned. Furthermore, they will remember detail the significance of which

they have realized; memory operates selectively, and ideas which group themselves around some central purpose or general conception, are tenaciously held, whilst those which serve no particular end tend to drop out of mind. To insist on detail of this latter character will require much expenditure of time in repetition, and in the end we may succeed in fixing nothing but words.

It will often save time to show a picture instead of to describe, but there is a certain fixity about a pictorial representation which is sometimes undesirable. This applies especially to poetical description such as the teacher may at times read with the class. On the other hand, where accuracy of impression is wanted, a picture is almost essential. To describe the Tower of London without a picture would probably be ineffective, though it might be possible to give a sufficiently clear impression of an Irish jaunting car, or of the Pied Piper without a drawing of any kind. Some further remarks on this point will be found in the section on Illustration.[1]

In the description of a process, such as that of steel-making, we approach more closely to narrative. There is an inner unity in the sequence of detail which helps the coherence of the parts. But the danger of overloading with detail is none the less serious. Everything which is accidental or irrelevant should be left out, except in so far as it gives "atmosphere" to the story. It is no part of the process of steel-making

[1] *V.* p. 201 *seq.*

that the men engaged in it get very hot and have to put damp cloths about their legs to prevent themselves getting burnt, but it gives a human aspect to it which vivifies the description of the process itself. The danger is that the class may seize upon points of that kind and miss the essentials. In the majority of such cases, verbal description will need to be supplemented by pictures, models, or other illustrative material. Description is most in place when it is actually paving the way for first-hand observation.

EXERCISES.

1. Consider Wordsworth's poem *The Daffodils.* How far is the description likely to mean anything for ordinary town children? What presuppositions in experience does the poet make of his readers?

2. Read the descriptions in *The Lady of Shalott.* Which of them, as they stand, might be apprehended by children of twelve? When would difficulty arise, and how would you overcome it?

3. Make a similar study of *The Forsaken Merman,* distinguishing the descriptive from the narrative parts. Write out a short statement such as you would make to a class of eleven-year-old children in order to give a setting to the first stanza, and make it possible to read the poem straight through. Where would you expect their attention to flag? Why?

4. Write out such description as you would use in connexion with the *Parable of the Sower,* which you are telling to country children who have never seen anything but a drill used in the fields?

5. Tell the story of the passage of the Israelites over the Red Sea, giving just such descriptions as will add to the effect of the story without injuring its dramatic character.

6. Give two descriptive lessons on *Holland and its People*, choosing details to bring out—

(*a*) The valour and industry of the Hollanders.

(*b*) The characteristic Dutch landscape, the cleanliness and picturesqueness of the country towns, and the quaintness of the country people's dress.

7. Make a careful study of *John Gilpin* with a view to finding out how the descriptive touches help on the narrative.

8. Read Chapter I. (Contents of Children's Minds) in *Aspects of Child Life and Education* (Stanley Hall). Draw up a list of ten common geographical terms and find out what ideas they stand for in the minds of half-a-dozen children from 10-14 years of age. (*N.B.*—You must take one child at a time and devise such means as you can for the purpose.)

CHAPTER V.

EXPLANATION.

Flower on the crannied wall,
I pluck you out of the crannies,
I hold you here, root and all, in my hand,
Little flower—but *if* I could understand
What you are, root and all, and all in all,
I should know what God and man is.—(Tennyson.)

IT is not uncommon to find the words *description* and *explanation* so loosely used as to suggest their being almost interchangeable. It is, however, important to distinguish both the words and the occasion a little more carefully. The purpose of description is to call up images; we describe when we give an orderly account of an object as we see it or "sense" it in any way. The purpose of explanation is to bring out the connexions between things, to bring them together under systems. We may be asked either to describe or explain a barometer. In the one case we shall be concerned with a particular instrument which we have in our mind, and we shall try to do with words what a draughtsman might do more effectively in line or colour. We try to give sensory detail enough to enable the person to whom

our words are addressed to picture the barometer. In the other case, our aim is to show how the barometer is a special application of some general principle or principles which enter in various ways into many other facts of our experience.

Explanation in this sense is a normal tendency of all our minds. It is implied in much that we call observation. We noticed that our friend looked ill; such a statement goes considerably beyond the actual things we saw. He was paler than usual, that was all; and we offered a tentative explanation of his pallor. We refer his particular appearance to the commonly accepted view that illness and pallor go together, and by thus putting it into a system we are attempting to explain. This kind of explanation is exceedingly common in daily intercourse. We say that we saw the spark *explode* the gunpowder, we heard the gun *fired*, we witnessed the *accident*, and so on. In all these cases certain sensations were received, and we suggest an interpretation. Not a profound one, it may be; nevertheless we add to that which we actually perceived, by putting it into connexion with like experiences when the connexion between the explosion and the spark, etc., was beyond question. We try to explain by referring to some underlying general principle which we have formed as a result of experience or which we have gathered from other sources. In cases of the kind, we should perhaps find it difficult to defend our explanation. If somebody denies that what we saw was an accident, we can only repeat the details as

we saw them and decline further responsibility for our explanation.

In this simple form explanation may even precede description in the developing mind of the child. In his small self-centred world the child speedily discovers certain uniformities which systematize his experiences. There are "nice kind people" who are always helpful and others who always thwart him; there are things he may and things he may not play with. "Why was mother cross with you?" "Because I was playing with the sewing machine!" Here is an explanation which a child of two would give quite spontaneously. As his world gets bigger, these elementary systems into which he has divided it, break down. Thus he cannot explain why his father is never at home for his mid-day meal by reference to them, and so with a thousand things that are happening around him.

His system-making does not stop, however. The uses of things make a convenient basis for his explanations which every parent uses when the queries of his children reach him. Why do we always have milk instead of tea to drink? Why does it rain? Why are knives so sharp that they cut our fingers? Now and then their questions refuse to be answered in this way. Why do cups break when they fall? A child is foiled by the obvious uselessness of such a quality. It puzzles him because he cannot place it into the system of the world as he views it—he cannot explain it.

His question shows, however, the pressure of the native tendency towards systematization, and it is our business as teachers to guide and discipline this tendency. We shall need to adapt our explanations to the child's own way of looking at things, or to introduce him to new ones. As most people use instruments and tools of various kinds which they can only explain from the point of view of practical services, we shall allow children to use things long before we can give any higher explanation of them. They will keep temperature records long before they know anything of the principle of the thermometer. A man does not pump water from a well any more effectively because he knows all about air and liquid pressure.

Under the stimulus of school training, however, explanations are sure to be demanded. Indeed, one of the things we have to learn is the art of putting our pupils into such circumstances as provoke the demand. Nothing is less likely to be successful than an explanation forced upon people who do not want it.

To explain is to interpret, to give a meaning to. An explanation must be both clear and adequate. Its clearness depends upon whether or not that which was explained to us has been put into some system or other which has grown up in our minds through experience. A teacher has, of course, wider experience than his pupils. His experience is also more highly organized than theirs. Hence an explanation which might be clear to him would be nothing but words to his

boys. This difference is a grave source of error in explanations.

Consider, for example, the following answers to the question: "Why does the book fall when I loose my hold of it?"

(*a*) Because it is heavy.

(*b*) Because all bodies fall unless prevented from so doing.

(*c*) Because of the earth's attraction.

(*d*) Because all bodies attract each other with a force directly proportional to their masses, and inversely as the squares of the distance.

Which of these answers shall be given depends entirely upon the person who raises the question—the range of his organized experience, of his knowledge in other words. The first answer might serve for a very small boy, the second for one of eight or nine perhaps, and so on.

So with all our explanations. We shall have to decide just how far we can carry them. Everything depends upon the systems into which the boys' knowledge is already organized. Suppose it is the collier's Davy lamp we have been describing, and a boy asks why the dangerous gas outside the lamp is not ignited. His question shows that he probably knows nothing about conductivity or about the ignition temperature of gases. We cannot therefore explain the lamp by a brief reference to these general principles. We must satisfy ourselves with what would be for us a partial explanation, based upon demonstration with wire gauze of

varying mesh and an ordinary Bunsen burner. He sees that if the gauze gets red-hot the gas above the gauze ignites; that if the mesh of the gauze is very fine, it does not quickly get red-hot. He can now apply this knowledge to the case of the Davy lamp and so "explain" it. A further why? might, of course, arise. Why does the gauze of wide mesh get hot sooner than that with small? If we are prepared to demonstrate the principle of conductivity, we can satisfy the inquiry; if not, we must put it off to another more convenient time.

This problem of how far back we can carry an explanation is, of course, constantly arising. An explanation is adequate when we have made use, so to speak, of the most precise and widely embracing systems our pupils have at their command. It will be clear and convincing in proportion to their real command of the general principles to which reference is made. To explain the mercury barometer by referring its behaviour to atmospheric pressure would not be clear to a boy who knew nothing of that subject, nor would it be convincing unless he had also some knowledge of the transmission of pressure in a liquid. Under certain circumstances it would be an adequate explanation to refer to the use of the instrument.

There are, in practice, certain other pitfalls into which inexperienced teachers fall when giving explanations. An explanation may break down because the class (or a boy in the class) is not quite clear how the general principle is related to the

thing the teacher is explaining. If a lad thinks the index finger the essential feature of a barometer, he may be no nearer an explanation if we talk to him for an hour about air pressure. It is the easiest and commonest thing in the world to find boys in a class going astray through mistaking the irrelevant for the relevant — particularly in scientific demonstrations. The wise teacher tries to avoid this difficulty by careful preliminary analysis of his apparatus. He is careful to assure himself that his boys know exactly what it is he is going to explain, and the exact significance of the various parts of the apparatus he may be using. For this reason he is usually not satisfied with the apparatus itself. He uses a diagram in which all the irrelevant features of his machinery are omitted, and he also insists on the boys themselves sketching the apparatus that he may be quite sure whether or not, for example, they have grasped the significance of that tube which goes to the bottom of the flask in one case and in another only just pierces the cork.

Although explanation may be psychologically prior to description, yet description is a necessary precedent to the more careful explanations demanded by mature people. Description means the orderly analysis and the careful arrangement of detailed parts, and it is by the more careful examination of things that their deeper relationships are brought out.

The actual procedure to be adopted when we are trying to arrive at an explanation must depend upon the nature of the special case. We are dealing with

the causes of *rain*, for example. It is necessary that the class should be clear about the presence of moisture in the air, about evaporation and condensation. In such a case, the children's experience will probably furnish all the facts we want. They have seen steam coming from boiling kettles, they know how clothes are dried, and how windows steam on certain occasions. By cross-questioning we can, that is to say, lead the children to interpret—or very nearly interpret—the phenomenon. Again, a boy with a working knowledge of indices only needs to marshal his facts to have the principle of logarithms revealed to him. It is necessary here to insert a warning. Unless we are quite sure the necessary knowledge or experience is already in the minds of our class as a whole, it is waste of time to beat about the bush in the hope of getting from them what is not there. Half our lesson may go in the vain attempt to "elicit" some fact or other which a little reflection on our part would have shown that it was unreasonable to expect. This mistake is especially liable to arise in those lessons which the teacher has taken great pains to prepare. *Not every schoolboy knows what the teacher himself has probably only recently learned.*

At the same time, we shall be wise to get as many relevant facts from the class as we can before explanation is begun. By so doing we may set up the desire for explanation, which is a first condition of success. Thus, in an elementary science course, we may propose to discuss the process of burning. We think out

a series of questions which will direct their observation of the process as they know it in their daily experience. Thus—

(i) Have you ever seen burning without flame? Give instances if you have.

(ii) Do things always disappear completely when they burn? Give examples.

(iii) How do things begin to burn? Have you heard of things burning that were not "set on fire"?

(iv) How does a match begin to burn? Is it hot before it burns?

(v) How do you make a poor fire burn better?

(vi) Can you find a reason that will account for all cases of burning?[1]

In this way a host of problems and difficulties will have been raised in the minds of the class, and the subject of burning is suggested as one worth more careful inquiry. The teacher suggests beginning with a very simple case (e.g. that of magnesium) in the hope of tackling the more complex ones successfully later on.

By procedure of this kind intelligent curiosity is aroused, and explanation is welcomed because of the feeling of freedom which it gives. Genuine perplexity is the best forerunner of explanation.

As we have already stated, explanation implies reference to such systematized scheme of things as exists in the mind of the person to whom it is addressed. There is, of course, a commonly accepted

[1] *V.* Wilson and Hedley, *Elementary Chemistry, Progressive Lessons in Experiment and Theory*, Part II. pp. 6-7.

scheme of the universe to which amongst educated people explanation will have reference. But this accepted scheme is not fixed and final, and explanations which are received to-day may be rejected at some future time. The bolder spirits of every age are usually aware of facts which do not fit into the current view of the universe. They cannot, that is to say, *understand* them. Thus research is provoked, and there is in consequence a steady process of revision of accepted ideas. Knowledge advances and explanations change.

The explanation of a particular fact may change in two ways. It may have been put into a wrong system. Thus we no longer attribute the peculiarities of the climate of Norway to Gulf Stream influences, nor does a ten-year-old boy attribute the phenomena of the Christmas stocking to a mysterious visitor who enters his bedroom by the chimney. On the other hand, a fact when it is known in greater detail may present features so new as to involve actual reconstruction of our fundamental notions. We are only just beginning to realize what changes of outlook were involved in the acceptance of the doctrine of evolution, nor has the layman yet got so much as a glimpse of the significance of recent advances in physical science connected with the study of radio-active bodies. When old and far-reaching theories give way to new, explanations have to be revised all-round.

EXERCISES.

1. Tell the following story to various groups of children differing in age between six and ten; then ask them to give an explanation of Jan's ill-luck. Classify the "systems" to which their explanations refer, noting especially how they vary with the age of the children :—

"At the end of the term the schoolmaster gave each of his boys a box of sweets. Jan wondered where he got them and he watched to find out. He saw the schoolmaster take one box to a field and bury it under a tree where he left it. Jan saw him go another night and wave a stick over the place, muttering a charm; and the tree budded forth boxes of sweets to the number of Jan's schoolmates. When Jan received his box the next day, he thought he would follow the schoolmaster's plan, so he went to the same place, buried his box and left it. Next night he went again and waved the stick, saying some words at the same time, but the tree bent down its boughs and beat him black and blue!

"Jan wondered why things happened so differently to the schoolmaster and to himself."

2. Critically consider the following "explanations" :—

(*a*) It is wrong to say "they thinks" because *thinks* is singular and *they* is plural, whereas they ought to agree.

(*b*) The fire is burning well because I put the poker over the bars.

(*c*) It rained heavily because the barometer fell considerably.

(*d*) I was away from my class owing to indisposition.

(*e*) Why is there such a crowd here now? Oh! there always is at this time of the day.

(*f*) The child was late through no fault of his own.

(*g*) It has rusted because it has not been kept dry.

(*h*) His action was in keeping with his character.

(*i*) He came to me—to inquire the cost of your proposal.

3. What explanations would you offer to the following questions (*a*) to young children, (*b*) to boys of 13 or 14:—

(*a*) Why is it difficult to walk on ice?

(*b*) Why *must* we go to school?

(*c*) Why does sunshine make the fire go out?

(*d*) Why are naughty boys punished?

(*e*) Why does the sun shine in the daytime and the moon at night instead of the other way round?

(*f*) Why does a horse wear a collar?

(*g*) Why are some people poor and others rich?

(*h*) Why does school open at nine o'clock?

(*i*) Why do policemen wear uniforms?

4. How would you explain the word *elements* in each of the following cases?—

Iron and oxygen are elements.

The fury of the elements.

The elements making for peace were . . .

He does not know the elements of the subject.

5. What difference do you note in the nature of what is called for in each of the following questions?—

(*a*) Explain the following allusions . . .

(*b*) Explain carefully why coal fires go out if not attended to, but gas fires do not.

(*c*) Please explain his (or your) conduct.

6. Is a definition an explanation?

7. A boy who knows that $\frac{18}{21}$ may be "cancelled" down to $\frac{7}{6}$ makes the following use of his "knowledge": $\frac{\overset{1}{\not 8} + 3}{\underset{2}{\not 16}} = \frac{4}{2} = 2$.

What "explanations" would be necessary?

CHAPTER VI.

OBSERVATION.

I.

Man sieht nur was man weiss.

July 15.—Just after the Wharfe enters Bolton Woods, there is on its left bank a tract of swampy ground with ditches and pools. In summer these are overgrown with duckweed, which is, as all the world knows, common everywhere in stagnant water. To-day I was walking to Barden, when I stopped to hunt for aquatic insects among the duckweed. I saw a peculiar yellow light reflected from the floating duckweed, and, on looking closely, perceived that almost every frond was in flower. The yellow light was reflected from the anthers, which stood out from clefts in the edges of the fronds. *Man sieht nur was man weiss.* A few years ago I had never seen duckweed in flower, and supposed that it seldom or never flowered in England. A botanical friend, Mr. Cheeseman of Selby, took me to see it in flower, and since that time I have discovered how common the flowers are, and how easily they may be seen by an attentive observer.—(Prof. Miall, *Round the Year*, p. 192.)

WE can only see what we know! Prof. Miall's story is a good illustration of the truth of this dictum, which does not, however, mean quite all that it appears to

mean. Prof. Miall *might* have found the flowering duckweed for himself, even though he had supposed it did not flower in England, but the attitude of mind which he describes would, at least, not have been favourable to the discovery. We all know that a botanist sees much more in a flower than one whose interest is simply confined to its decorative qualities, just as men see more in a game of cricket than women usually do, simply because they know more about it, and, knowing what to look for, they appreciate the points of the game as they occur. Similarly, a musician listens much more "intelligently" to an orchestra than an unmusical person, who frequently does not conceal his boredom during the performance. To observe, in other words, we need knowledge, and the more we know about the thing under observation, the more penetrating will be the result.

Yet it sometimes happens that what we know (or think we know) makes us blind to things that lie at our very feet. To quote Dr. Miall again:—

Many years ago I got a practical lesson on the subject. I was visiting at a country house in Craven, and the lady of the house showed me her beautiful fernery with some pride. "I am anxious to get the Adder's Tongue fern," she said, "but I have hunted for it in vain." I knew that there were some likely meadows at no great distance, and proposed a walk. We went two or three miles, and by groping among the mowing grass soon found ten or twenty plants. The only difficulty was to distinguish the leaf of the Adder's Tongue from the rather similar leaves of hawkweed and

daisy. The plants were packed up, and we walked back. In every field, now that our eyes were opened, we saw the Adder's Tongue, and said with some amusement: "If we had only looked as we walked along, we might have saved ourselves the trouble of a long walk". At last we entered the grounds again, and on the front lawn, five yards from the front door, there was as much Adder's Tongue as could be desired.[1]

Dr. Miall's idea of where to find the fern was correct enough as far as it went. It was at once a help and a hindrance. He found the plant where he expected to find it, but failed to see it in front of him. Experiences of the same kind are probably familiar to everybody, and we are led to conclude, in spite of much talk about training observation, that "there is not properly an art of observing". There may be rules for observing, but these, "like rules for inventing, are properly instructions for the preparation of one's own mind; for putting it into the state in which it will be most fitted to observe, or most likely to invent".[2]

The surprise of the unexpected, or the novel, may stimulate observation, but examining a strange object in entire ignorance of what to look for could not carry us far. Children look at strange things in vague wonderment, but older people proceed more or less systematically. At least they note the general appearance of the object—its form and colour—and if they handle it, they may remark upon its texture, its weight, and

[1] Miall's *Round the Year*, p. 2.

[2] J. S. Mill, *System of Logic*, Bk. III. ch. VII. § 1.

so on. Even in this simple proceeding, certain guiding ideas of a very general character are obviously present, and to go further than this demands special knowledge.

In observation, then, we direct our attention to some object in a purposeful way. There is some need which we would satisfy; the need may be a temporary one brought about by the exigencies of the moment, as when rival boxers each watch intently the movements of the other; or it may be a permanent need, either native or acquired. Thus we are always keen to notice the things which concern our personal safety and welfare. Observation of this kind springs from a native need common to all men. Acquired needs, on the other hand, differ widely from one person to another; this man has acquired a business habit of mind, and the smallest fluctuations of a particular market never escape his attention; another man has given himself up to the pursuit of music, or book collecting, or photography, or gardening. No concert announcement leaves him unmoved, no book-shop in his town has not been searched, no printing paper has not been tried, and no "handy" tool has not been tested. We may, of course, have more than one of these acquired needs, though the more specialized they are the more likely are they to produce extraordinary keenness of observation in their particular direction.

Between these two extremes of the momentary and the permanent need, we have frequent occasions for observation—problems arise which it is important to

solve, difficulties have to be overcome. Success depends upon close, well-directed observation. It may be only a game of whist, but if we would make a tolerable partner, we must watch the cards carefully in order to determine the nature of the forces on either side. Here again, knowledge of the game will enable us to notice points which a novice would miss—a call for trumps, for example.

To sum up, then, we find that observation is essentially a purposeful act ; that vacant looking around is not observation at all in the right sense of that word ; that we are naturally observant when we feel the need, and the more acute the feeling, the better is the observation likely to be in any event, though success depends mainly upon our knowledge of what particulars to look for, that is to say, on our power of distinguishing what is relevant from that which is irrelevant to our purpose. *Man sieht nur was man weiss.*

It remains now to consider *children as observers.* They have, of course, relatively limited knowledge, and what they know is for the most part attached to home and play activities, where doing is the outcome of and the stimulus to thinking. The small responsibilities placed upon them create needs which they feel, and within their range they are quick to see what matters. Similarly, their bodily needs and the pleasures of the palate quicken their observation in quite extraordinary ways. As they grow older, their undertakings become larger and spread over a longer period of time. The lad of twelve will spend hours bird-nesting, whilst the

boy of seven would hardly keep it up beyond the first hedgerow. The town child with his Saturday halfpence knows all the sweet-shops within a mile of his house; his father may pass them much oftener, but probably could not locate a single one. Attention, in other words, always accompanies a *felt* need.

A child's needs often press so hardly upon him that they render his observations valueless. He has very little intellectual control, and he tends to see just those things which he wants to see. No child who wants to go out to play will allow himself to see the drizzle which might make it impossible. He cannot see why a playfellow is objected to by his parents on the ground of his dirtiness. Dirtiness is not dirt to him. The values of his observations are different. Above all things, he dislikes doubt and uncertainty. He cannot suspend judgment as we adults often find it necessary to do.

Lastly, he is very changeful. The younger the child the more momentary are his interests; what is newest and most striking in his environment attracts his notice, and gives him pleasure. Curious noises, brightly coloured objects, things that move, delight his senses long before he can understand them; but this is not, strictly speaking, observation, because there is no directing idea behind it. He only begins to observe when he *wishes* to examine things—to see, for example, what his toy horse is made of. As his interests widen and he finds himself able to do things, when he experiences success and failure, his necessities

compel observation. But his purposes remain short-lived and capricious for quite a long time. The business of the school is to lead him gently into more continuous lines of activity, in which knowledge is gained partly by direct experience, and partly by such direct instruction as will illuminate his preliminary experiences and increase his power of interpreting them in the future. In this way interests grow, that is to say, new and permanent intellectual habits are acquired.

It is of the highest importance that we should have clear ideas as to what observation really means; there is much confused thinking among teachers about the subject, and not a little effort is wasted in consequence. No doubt much of the misapprehension is due to the English interpreters of Pestalozzi whose "Object Lessons" were the precursors of much of the same sort of thing as is still too common in the world of school life. Thus Dr. Mayo, an English disciple of Pestalozzi, wrote: "To lead children to observe with attention the objects which surround them, and then to describe with accuracy the impressions they convey, appears to be the first step in the business of education". With this in view he drew up a series of object lessons, in which such topics as glass, india-rubber, loaf-sugar, gum-arabic, wax, ginger, were treated. His method was to get six-year-old children to "remark the qualities observable by the simple operation of the external senses," and he defers to a later period observations of a higher order. Here is a sample lesson:—

Teacher.—"What is this which I hold in my hand?"

Children.—"A piece of glass."

T.—"Can you spell the word *glass?*" (The word is written on the blackboard, and is thus presented to the whole class as the subject of the lesson.)

(The piece of glass is now passed round the class to be examined by each child.)

"You have all examined this glass: what do you observe? What can you say that it is?"

C.—"It is bright."

T. (T. having written the word "qualities" writes under it —It is bright.)—"Take it in your hand and *feel* it."

C.—"It is cold" (written on blackboard).

T.—"Feel it again and compare it with the piece of sponge that is tied to your slate, and then tell me what you perceive in the glass."

C.—"It is smooth—it is hard."

T.—"What other glass is there in the room?"

C.—"The windows."

T.—"Look out at the window and tell me what you see."

C.—"We see the garden,"[1] etc., and in this way he arrives at the other qualities, viz. transparent, and brittle.

The method illustrates very well Pestalozzi's idea, "first the thing and then the word," but *it is not observation*, and the mischief is we have too frequently translated what is, in principle, the same procedure into modern practice under the guise of observation lessons. In its worst form it has been pilloried by Mr. Sneyd-Kinnersley.

[1] Mayo's *Lessons on Objects*, 1842.

LESSON ON THE COW—INFANTS.

Picture of a Cow on the Easel.

P.T.: As I was coming to school this morning along High Street, I heard a great noise, and there was a man in a blue frock driving a great big animal down the road. What do you think it was, babies?

Chorus: A kyow, teacher.

P.T.: Yes, a cow; and here is a picture of a cow. (*The class regard it with blank indifference born of familiarity.*) Now the cow is a very useful animal:—

Billy Jones: I seen a kyow this mornin' as I was comin', *an' it was a bull:* and it ran at a mon an' 'orned 'im nearly, only 'ee got away—(*pauses for want of breath*).

P.T. (*coldly*): That will do, Billy, you musn't talk now till teacher has done. And it gives us milk. What little boy or girl had milk for their breakfast this morning, I wonder? (*Alarums and excursions, many competing claims to have had two moogs full.*) Yes, and that came from the cow. What has it on its head? Horns, yes. And what can it do with its horns, Jenny?

Jenny: Hike yer (i.e. *toss you*).

P.T. (*much shocked*): Oh, Jenny! I told you never to say "hike". The cow would give you a great knock. And how many legs has it got?—etc.[1]

Apart altogether from the humour of circumstance introduced by the author, we may note two objections to lessons of the kind. First, the subject-matter is so trite that the class would be bored to death but for the irrelevancies of irrepressible Billies, and second, the

[1] Sneyd-Kinnersley, *H.M.I.*, p. 299.

activities of the class are entirely purposeless, unless we are to regard the mere desire to please (or to tease) the teacher as supplying satisfactory purpose. In so far as we do this however, the observation is directed in a way altogether different from that which was in the teacher's mind. Under the impulse of such a need, many lessons become observation lessons that would not ordinarily be put in that category.

Let us now look at another and a more ambitious type of so-called observation lessons not uncommonly found in books of wide circulation :—

The Earthworm.

Aim.—To teach that lowly things are not to be despised, and that Nature has a use for all her children. To connect structure and habit, and so train reasoning power. To sustain interest in animal life.

Time.—Two lessons of thirty minutes each.

Class.—Children *six to seven years.*

Apparatus.—A few earthworms kept damp in glass dish. Enlarged drawing of an earthworm. Worm castings. Drawings of a section of body. Some earth. A spade and a picture of a plough.

I. *Introduction.*

As the lesson is to be *based on observation*, it will be necessary to keep worms in the school for a few days beforehand, in order that the children may make the creatures' acquaintance. There will be no difficulty in getting specimens. They will be brought by the budding naturalists.

II. *The Worms' Work.*

Question children as to *what they see the worms doing* in the flower-pot. (*Turning the mould over and over.*) How do they do it? They dig down into the earth and throw it up, *almost as if their heads were like the gardener's shovel.* Speak of a big field, hard and stiff after the winter. No use to sow seeds in it. Why? The tiny plants would be too weak to force their way down through the hard earth. If there is hard ground outside the school, send a boy to try to push a blunt, thick stick into it. Is it easy? What must be done to the ground? Children who have gardens at home will know that it must be dug up. How is it done? Show the spade, and let a child imitate its use. Think of the big field needing the same treatment. Could a man do it easily with his spade? It would take too long. (Show picture of the plough, and explain its use.) Tell children they have seen another kind of plough at work. Where? If there is any difficulty in getting an answer, ask what the plough does, and compare with the work of a worm. There are vast numbers of worms at work in every field and garden. They make holes down in the soil in all directions. These let the rain through, and make way for the baby roots of the new plants to grow. The earth, which is constantly turned over, gets freshened by the sunlight and air, and so is made more useful.

(Some of this must be told, but question to get as much as possible from the children. The effect on the soil of the castings can be left till later.)

Question as to the nature and value of the worm's work.

III. *How it is Done.*

Question the boy who was sent out with a blunt stick. Send him again with a pointed stick, and let him give his

opinion on return as to which is the better tool for the purpose, and why.

Show the worms; let children see if any part corresponds to the pointed end of the stick. Yes; the pointed end is the head. The worm feels with his head, and usually crawls that end first. Draw attention to the shape of the body (let children describe), long, round, and pointed, like a thin, pointed stick, and well fitted for boring holes in the ground. As he works down he displaces some of the earth, and what does he do with it but eat it. It sometimes takes him hours to dig down as far as he wants to go, but he keeps on digging and eating till his work is done. The soil passes out of his body in little twisted heaps called worm-castings. (Show specimens. Let children recall where they have seen them.) These make the soil rich and good for growing plants.

IV. *Structure of the Worm.*

General method. Observations of specimens and pictures, and description by the children themselves.

1. *Shape*, see above. Let children draw worms on blackboard.

2. *Head*, pointed; *eyes*, none; *ears*, none; *nose*, none. It can neither see nor hear, and smells very little. *Mouth* is not easily seen, but there must be a mouth of some sort, because the worm is an animal and must eat. It is a wide, round opening just under the head, and covered by a lip when the worm is not eating. (The children will have seen the worms feeding during their observations.)

3. *Body*.—How does the worm feel? Cold and soft and moist. Any bones? No. Question as to the markings on the body. They are round, and at almost equal distances

apart. They are the rings which make up the worm's body. (Show sectional drawing.)

4. *Bristles.*—Has the worm any legs? How does he move? Show diagram of segments of body and the little bristles. Let a child draw his finger along under-side of worm very gently, first one way and then the other. One way it feels smooth, the other way it feels rough. Every ring has eight of these little bristles, four on the lower part of the body, and two more at each side. At the end of each bristle is a tiny hook. . . .

Bearing in mind the canons of observation, where are the directing ideas or the problems which guide these babes of six in their observation? Let the student try the effect of putting a few worms into a flower-pot full of soil, and leaving it in the classroom for a class of six-year-old children to watch. Count the numbers who will arrive at that very simple result—"turning the earth over". Calculate how much *real* observation there is in the third and fourth sections. How are they to discover that the worm can neither see nor hear? Is there any *felt* need prompting their observations? Lessons of the kind are typical of much that passes for observation, and, in the hands of a strong teacher, they are not without value as *descriptive lessons with illustrations*, but to call them anything else is to deceive ourselves, and to deprive the children of the valuable discipline of real observational work which should come later, and towards which description is an essential step.[1]

[1] Of course the procedure indicated in the lesson would need modification.

We print another lesson of the same type; its faults are even more pronounced.

The Snail.

The teacher is provided with snails in jam jars, with earth, etc., so as to induce snails to behave in a normal manner. Children of six to seven.

Step I.

Aim.—To find out something about snails and how they live. What do we call this creature? Who can tell me something about it? It lives on cabbages.[1] It lives on stone hedges. It has sticky stuff on it. Birds eat them. Snails eat the plants in the garden.

Carefully sum up the children's ideas before proceeding to the second step of the lesson.

Step II.

(*a*) *General Observation.*

1. *Shell and Soft Body.*—Let us look at our snails. What part of the snail can you see? A shel and a soft body. What is the body like? Something like a sausage.[1] Yes, but the sausage is round.

2. *Horns.*—The snail is flat underneath; at one end are four little horns.

3. *Foot.*—The flat part underneath is the snail's foot. He has one big foot. How many feet have we? Let us measure the snail's body. How long is it?

4. *Skin.*—Feel the skin. It is very crumpled and slimy. The skin is called the mantle, because it wraps round the snail.

[1] Answers actually given by children of six.

Recapitulate.—The snail has a soft body, with a head, horns, and a foot. Its skin is crumpled and slimy. It carries a shell.

(*b*) *Systematic Observation.*

1. *Head.*—Which is the snail's head? The part which has the four horns. (Let us draw the snail's head on the blackboard, so that we may see just what it is like.) This is the snail's face. What are the names of the parts of our faces? Eyes, nose, mouth, ears, cheeks, chin. Yes, the snail has most of these parts too, but they are not like ours.

(i) *How the Snail Sees.*—Where are the eyes? At the tip of the two longest horns. They are not really horns, for horns are hard. We will call them eye-stalks. Why are his eyes at the ends of long stalks? Because he can turn them about easily to find his way. Some people think the snail cannot see plainly as we do, but can only just tell light from darkness. What do we do when the light is too strong for us? Shut our eyes. The snail cannot do this, for he has no eyelids, so he just pulls his eyes down into the stalks by turning them outside in. (Show exactly how this is done by fastening a piece of thread to the inside tip of a glove finger, and pull the tip of the finger in, just as the snail does his eyes.)

(ii) *How he Smells.*—What is the use of the other horns? We do not know; perhaps they help him to find his way. Some people say he smells with them. What do we smell with? Perhaps the other two horns are his noses.

(iii) *How he Hears.*—Can the snail hear sounds? That we do not know; but he has two little holes on the back of his neck that may be his ears. (Mark these on the diagram.) What a fat neck he has. It is hard to see which is his neck and which his head and body.

Recapitulate.—The snail's eyes are on stalks; he has holes for ears; he smells with his little stalks; and he has a fat neck.

Again note the entire absence of directing ideas. What, for example, were the various answers to the question, "What is the body like?" The first part, again, is pure description, with illustrative examples. Under what is called above "systematic observation" we only need to take the lesson as printed to discover that the teacher must tell everything. What commonly happens is that the teacher asks questions of the kind, and finds in a class of thirty or forty a child whose father has shown him these things on a garden snail; he can answer, and is proud to hear himself referred to as a clever boy. If we ask ourselves when people really found out how the snail sees, smells, and hears, we shall arrive at some idea of whether children can discover these things by their own observation. Let us tell them first frankly and freely; let us not call it systematic observation. When children have listened to us and seen our illustrative material, they will probably hunt for snails, or pick them up when they see them just for the joy of looking at them again, or to find out if all snails are alike. But even description has its limits from the point of view of detail. We may surely doubt the wisdom of diagrams to show children of six what snails' teeth are like; the difficulty of relating the diagram to the actual snail is enormously beyond them.

II.

With the lessons which have been quoted for critical study, because they embody the fault of loose thinking about observation in the special form which is so rife in the schools, let us compare another observation lesson for children from ten to fourteen. It is taken from *Practical Nature Study for Schools*,[1] by O. H. Latter, M.A. In the preface to his book Mr. Latter says: "The object is to provide lessons in nature study, such that the work *must* be done by each individual pupil as the result of direct observation". The *teacher* supplies the directing ideas in the shape of questions and problems. The student will note also how these exercises in observation are mingled with instruction which is not preceded by a question, because it refers to things which boys could not be expected to observe for themselves.

Earthworm.

Dig up a few worms; put them on the surface of the soil, or upon a board that you have previously moistened (do not put them on a dry surface, it causes them discomfort), and watch how they crawl along.

1. Describe the shape and arrangement of the body, the actions of the animal, and the changes in its shape as it progresses.

2. Time the worm as it crawls over a certain distance.

3. At this rate how long would it take a worm to go a mile?

Hold a worm gently between your thumb and fingers,

[1] J. M. Dent & Co.

keeping the animal at about the level of your eyes, so that you can see its under-side. Allow the animal to crawl forward between your fingers: it will stretch its head out into the air in its endeavours to escape.

4. What can you see and feel upon the under-side just as the worm begins to shorten its body after extending it?

5. How many of these things are there on any one ring (segment) of the body?

6. Of what use are they?

Put a worm on to a clean and smooth glass plate with water in sufficient quantity to wet the whole surface of the plate.

7. What change do you now notice in the progress of the worm?

8. Explain the movements of the worm when on the wet glass.

9. What differences can you detect in the colour and shape of the head and tail ends of the body?

10. About how many "rings" are there altogether?

If your specimen is grown-up it will have a thick band about a third of the total length of the body from the head end. This band has several uses, one of which is to form a cocoon in which the worm lays its eggs. The band is not a scar marking a previous injury.

11. What special uses does the worm make of its head and of its tail, in accordance with the differences of shape? You will be able to answer this question (i) if you watch a worm make its way into the ground again after you have dug it up; (ii) if you go out with a lantern on to the lawn or cricket ground on some warm and moist evening, and try to catch a few of the worms that you will then find in hundreds, lying upon the surface in the closely cut grass.

You must be careful to move gently as you do this : if you tread heavily the worms will get out of your way before you see them.

12. When you are catching worms in this way, try to make out whether the worms take any notice of the flash of your lantern.

13. Write on the opposite page an account of all you find out about worms during your evening hunt. How do they use their tails?

14. What are they doing on the surface of the soil at that time of day?

15. What is the use of the slime with which their bodies are covered?

16. Do worms do anything to protect the mouth of their burrow?

Examine the surface of the ground under trees, especially firs and horse-chestnuts, and see if you can find anything that the worms have done. If you stand still for a few minutes on a favourable day in a place where you have found several worm-burrows, you will probably see them at work. As a matter of fact, earthworms are extraordinarily abundant in nearly all kinds of soil.

17. How do they usually indicate their presence in lawns and other places where the grass is kept closely mown?

18. What effects do worms produce in the soil by burrowing about within it, and by throwing it up on the surface?

19. Is vegetation then helped or hindered by the presence of worms in the soil? Give reasons for your answer.

It is not difficult to procure the eggs of worms. If you get some big worms with the thick band well developed, and put them in an earthenware pan with some thoroughly

decayed leaf-mould, you will probably get several of the cocoons in which the eggs are placed. The leaf-mould should be damp but not sodden. The cocoons are of a dirty yellow colour; in shape they are rather like a lemon; their length varies from about one-sixth to one-third of an inch according to the species of worm. As a rule only one worm hatches from each cocoon. It is worth while trying to rear worms from the egg. Very little is known about the rate at which they grow, and it may be your good fortune to find out about them something which nobody has yet discovered.

In this case you will notice that the problems in observation are for boys of ten to fourteen, not for babies of six. There is nothing here about the structure of the worm, except just what the boys can really make out for themselves. Mr. Latter does not ask the boys to watch the worms feeding; there are no sectional drawings such as would probably mislead. The diagram may with older people be a guide to observation, but what shall we say of it when it is given to small children as a substitute for observation? We shall have something to say later about diagrams and their use; here we may give a general warning against their indiscriminate use in the primary school, except in the higher standards.

It may very fairly be asked whether or not there is such a thing as an observation lesson for young children. If this means whether we should provide a series of formal lessons in *sense training*, such as Pestalozzi believed in, the answer is no, for we can get all the

educational value there is in such exercises by other and more rational methods. Nor do we want mere information lessons of the Mayo sort. Children are bubbling over with activities of all kinds, and our problem is to take hold of these and direct them into useful channels; the children give us the lead. Our aim is not to impose upon them a highly artificial and abstract course of instruction based on an erroneous view of the way children's minds develop—we no longer teach children to read by spelling out their alphabet, nor are pot-hooks the first stage in the process of learning to write. Rather do we start with the things the children are interested in. Making use of what knowledge they have, we discuss the objects together, and questions are raised that require investigation. What is clearly beyond the possibilities of a child's investigation we either tell or omit altogether. Instead of "observation lessons" for young children, we want lessons in which the children are free to talk and examine and experiment, with the teacher's guidance and help.

We see then that observation is essentially a quest, and that successful seeking depends upon knowledge combined with keenness. But keenness (or interest) is a product of knowledge unless we are satisfied with that evanescent form which mere novelty stirs up in most of us. Hence we must give knowledge before we can properly ask children to observe.

By this means we establish interests, attitudes of mind, which make the boys observant when the ap-

propriate occasion comes. The objection to the old object lessons on lions, camels, etc., is not that they offer no opportunity for observation during the lesson; in this respect they do not differ from the lesson on the earthworm. It is rather that they do not deal with materials round about the child, and stimulate his curiosity in directions which offer opportunities for first-hand experiences. But a descriptive lesson on a lion is surely far better than the painfully obvious subject-matter which is embodied in so many lessons on a horse, a cow, or even a grocer's shop.

Observation, as we have now abundantly seen, implies intelligent looking. Now it often happens that looking is followed by disappointment. We see (or think we see) an interesting feature in the life of the worm; we cannot, however, be quite sure about it; we watch again in the hope of a like opportunity coming. It may be months before fortune favours us; a second chance may never come. This is characteristic of all observation. We take things as we find them, and describe what we see as effectively as possible. So many different factors enter into what we are describing, that it is often difficult, if not altogether impossible, to find them all working together in just the same way twice over, and what makes it still more difficult, more than one thing varies at a time.

In order to overcome difficulties of this kind, we try, whenever circumstances permit, to get control over the conditions which together determine the events we are observing. When they are completely under our con-

trol, we can repeat our observation whenever we like; we can vary the conditions singly and watch the result. Under circumstances of this kind we call our observation, experiment. The great advantage is that it can be repeated not only by the person who originally thought it out, but by others. It is thus possible to check results and arrive at certainty.

It is obvious that there are many intervening steps between what is observation pure and simple, and what constitutes perfect experimental conditions. Many phenomena lie altogether outside our power to control. We cannot interfere with the motions of a comet, or the movements of a glacier. We must content ourselves with regular observations. The same is true of the weather, the movements of the tides, the rise and fall of waters, and a thousand other things. On the other hand, we may seize special opportunities offered by changes of this kind to make experiments of more or less illuminating type. A gardener may sow his seeds or plant his cuttings in wet weather or in dry weather, and observe his results. This is an experiment of the crudest kind, for his estimate of wet and dry can only be a guess. In the laboratory, on the other hand, we might carry out experiments of the kind which would have some meaning.

Differences of this kind should be clear to the teacher when he is concerned with experimental demonstrations. What an experiment teaches depends entirely upon our knowledge of the conditions entering into it. In practice, teachers use the word experiment to cover

all the practical demonstrations and illustrations which are incident to lessons of a scientific or quasi-scientific character. More will be said on this point in the chapters on Investigation and Illustration. The actual "logic" of the experiment the student will read elsewhere. (See e.g. Bosanquet, *Logic*, Bk. II; Welton, *Logic*, Vol. II.)

EXERCISES.

1. Write down six things which you have learned in each of the following ways:—

(*a*) By being told.

(*b*) By reading.

(*c*) By actual observation.

In regard to (*a*) and (*b*) consider whether you have since made confirmatory observations, and in regard to (*c*) consider how you came to make the discovery.

2. By actual experience a boy learns that razors are dangerous toys. Is this a case of observation?

3. Distinguish between Nature Teaching and Nature Study. To what school ages are they respectively suited? Why?

4. Consider the following extract carefully and critically:—

"Rural industry more than almost any other industry depends for success upon power of observation. No keener observers in their special line could be found than the older shepherds and other skilled farm labourers of the last century. But they learnt to observe by helping their fathers on the land as children. Now that children must attend school at the very time that their minds are most receptive to external impressions, it is essential to introduce the opportunity for developing powers of observation into children's

schooling, which they would otherwise lose by being in the schoolroom. As a means of training observation, as well as of developing intelligence and obtaining knowledge about rural things, nature study is the best possible subject. But it needs to be properly carried out: there is all the difference in the world between an object lesson on a piece of coral, and the study of the rock that weathers down from the fertile soil of the neighbouring farms; between a lesson on an ostrich from a wall diagram, and the study of the poultry in the yard; between a lesson on the cocoa-nut palm and the study of cabbages or barley plants grown by the children. It must be the directed study of nature, as revealed in the surroundings of the school, by the children themselves; the subjects for study being so chosen, and the results of the study so systematized as to yield an idea of inter-dependence in nature, and a store of information about rural things which will be real and lasting, because obtained by what the children saw and found out for themselves. Care should be taken to adapt nature study very carefully to the age and mental capacity of the children. One would not expect the same completeness of observation and inference, even in respect of simple phenomena from children of seven to nine as from older children.

. . . . . .

"Throughout this work, drawing and description, oral and written, should be combined with nature study as a means of training exact observation and expression. It is when one begins to draw an object that one begins really to see it and to describe it that one begins to think clearly about it."

Is the writer's comparison between children helping their fathers on the land and the child at school legitimate? Why is the child on the land so observant? Is it a case

of receptivity to external impressions? Is it nature study or nature teaching that will take the place of the stimulus of farm life and responsibilities? What is the difference between an object lesson on a piece of coral and another on a cabbage, so far as actual observation goes? Is the comparison between children of seven to nine and that between children of riper years drawn from the right point of view? Under what circumstances will older children be observant of gardens and field crops, of the poultry and stock yard? Will a boy filled with nature-lore necessarily make a good shepherd?

5. "Things before Words." How far can you teach *things* without *words?* Does the word reveal the thing or the thing the word?

6. What do you understand by a Habit of Observation? How would the observant farmer fare in Cheapside? Why?

7. A boy of seven and a boy of twelve are each looking through a friend's stamp album Compare what they would be likely to see.

8. Draw up a series of problems in observation for boys of thirteen preparatory to a lesson (or a series of lessons) on the motions of the earth.

9. What systematic observations should precede lessons on climate (rainfall, temperature, winds, etc.)? How could these be organized?

CHAPTER VII.

EXPRESSION—I.

> . . . the native hue of resolution
> Is sicklied o'er with the pale cast of thought,
> And enterprises of great pitch and moment
> With this regard their currents turn awry,
> And lose the name of action.
>
> —(*Hamlet*, Act III. sc. i.)

EVERY observer of young children remarks upon their restless activity. In their case, thought apart from action is conspicuously absent—unless persistently repressed, they either give their thought immediate utterance in words, or give it instantaneous practical expression. Watch the unspoiled small boy alone and at play. He is roving about the nursery, picking up this object and addressing it, or adapting it to some passing fancy, then moving on to that, and finally just running hither and thither to no apparent purpose. This irresponsible, unorganized, capricious activity is characteristic of the free play of little ones. Every healthy child passes through this stage, when all the things he "senses" prompt him to action more or less appropriate. It is the simplest human form of mind activity, but experience soon teaches the child that his native impulses are not safe to follow.

Even within the family circle they bring so much discomfort to the child himself that he gradually imposes a barrier between many of his ideas and their practical execution. Little by little he learns to inhibit (as it is said) many of the impulses he feels—he has learned their unwisdom in various ways, sometimes from the unhappy results of his want of regard for the existence of others, and at other times from the physical pain which has come from his actual ignorance of the objects round about him—he has grasped the bright, attractive-looking knife, and run over the smooth surface of a builder's lime pit. We have to teach him "to look before he leaps".

But whilst discipline of this kind is a necessity, there is a grave danger of carrying it too far, especially when the child begins the formal period of his education. In his play he lives the complete life in which thought is consistently connected up with action. Hence Froebel speaks of play as the highest phase of child development. But in his lesson time he is too often cut off from this natural conclusion to thought. His school work thereby loses its feeling of reality: it becomes verbal and relatively ineffective as a training for life.

This danger has led to the pedagogic formula of Prof. William James—

NO IMPRESSION WITHOUT EXPRESSION.

But impression often leads to expression which is little more than a physiological outlet for emotional

change—we hear music and feel the tendency to beat time with our feet, we read an affecting story and dissolve into tears, or we clap our hands vigorously after a pleasing display of any kind. Expression of this kind does not make men of action—it is a mere escape for tendencies to movement common to us all. We need rather to inhibit than to encourage them, lest they should land us into mere sentimentalism and replace the craving to be up and doing which we feel when we realize ourselves most fully. To avoid confusion with this kind of expression, it is common to speak of self-expression, which includes only such activities as leave us free to put *ourselves* into them. Mere reproduction is not then self-expression, though, of course, it is not for that reason a useless exercise. But the able teacher will give more attention to those exercises in which freedom is the characteristic mark. It is, indeed, only by doing so that he will ever get an insight into the child's own mind. Only thus will he discover unsuspected ignorance and find out *his* peculiar way of looking at things. A company of boys in the middle section of a primary school were dramatizing the story of the Gunpowder Plot. One of them appeared with an empty jar. On inquiry, it was found that he was to represent Guy Fawkes, the man "who put the gunpowder in the pot". Here, of course, it is not merely that the boy has got the wrong word, the whole range of ideas has been completely wrong, and this may well happen even when the teacher's story is reproduced with verbal accuracy.

There is, of course, no limit to the possible direction which expression may take. A boy who has been interested in a lesson on a Lake Village may give it expression in making models of lake dwellings, or he may want to know more about primitive races and seek out books of travel, or visit the anthropological section of the local museum and hunt out more examples of their activities. If his teacher asks for an essay on the subject and the matter rests there, the response may serve an immediate school purpose, but it is essentially formal—typical, indeed, of many school lessons, the influence of which extends very little beyond the four walls of the classroom.

We have seen, on more than one occasion, a class of primary school boys busy writing an essay on the virtues of cleanliness. They were giving their ordered impressions of the previous day's lesson, but, on examination, there was scarcely a boy with clean hands in the class! It may be too much to expect boys from ill-equipped homes to appear at school with clean hands; in such a case, it would perhaps be less dangerous to give up the lesson until there are means in the school for insisting upon its practical exercise.

Again, in the case of a literature lesson, the right expression to look for is a keen desire for more, combined with an effort to get it. School exercises in this subject may be essential to accuracy, but they need tactful treatment, lest they should kill the budding interest in literature for its own sake.

In general, we may urge that we ought to be less keen to impart information than to give our pupils power. There is a tradition, now fast dying out, that the primary school teacher must give from twenty to thirty oral lessons a week; that the children must never be left to do things for themselves. This is, of course, the exact opposite of what our aim should be. We want to turn out boys who can put what they know to use, and who, when they do not know things, have a shrewd idea of how they can find out. A boy who can write from memory a description of the course of the Volga, but does not know how to use an atlas, or who can tell all the towns through which the Midland Railway passes, but cannot use a railway time-table, is a less effective person than his less well-informed friend who makes up for ignorance of that kind by his acquaintance with the ordinary man's tools.

In his efforts to make free use of what he has learned, the child is often brought to a standstill by the imperfection of his knowledge, and by his want of dexterity. At both points the teacher has his particular opportunity for strengthening the sense of the connexion between knowledge and power. "To have knowledge without practical power, to have insight and yet to be incapable of applying it in everyday life—could an unfriendly spirit devise a more fearful lot for a human being than this." [1]

[1] Pestalozzi, *How Gertrude Teaches her Children*, XII. 5.

EXERCISES.

1. How does a young child express anger, desire, fear? What impulses in these cases must he learn to inhibit? Why?

2. What contrary impulses must be felt by a child who is busily playing when he is called to go to bed? How would you expect ultimately to establish the right response without an inward struggle?

3. What are the impressions which a girl of twelve receives when she is reading aloud the instructions for making a pudding? Which of these impressions find immediate expression, and what various forms of expression may still follow? Which is finally satisfactory?

4. A teacher gives a lesson on Magna Carta; the boys are required to tell the story in writing (1) from the standpoint of King John, (2) from the standpoint of the Nobles. Would this be the end of the matter? If not, in what other ways might such lessons find results in expression?

5. You place before a class (1) a group of geometrical models, (2) a shaded representation of such a group, and tell them (*a*) to draw what they see, (*b*) to describe what they see. Compare these various exercises in expression in regard to their nature, their difficulty, and their effectiveness.

6. Reading maketh a full man, conference a ready man, and writing an exact man. Discuss this.

7. "No *expression* without *impression*." Make a sand model of a Norman castle as well as you can from memory, and then complete it by reference to books. What exactly have you found out both about yourself and about Norman castles in the process?

8. What expression played a part in arriving at the following ideas?—

(*a*) The sourness of early oranges.

(*b*) The hardness of oak.

(*c*) More haste, less speed.

(*d*) All is not gold that glitters.

(*e*) The importance of self-control.

9. Recall your efforts to "express yourself" when you were learning to swim (or to play the piano); describe your attitude of mind and your progress. To what was your progress due? Contrast this experience with that of a child for whom modelling in clay or plasticine is part of the routine of school activity.

CHAPTER VIII.

EXPRESSION—II.

"In that case," said the Dodo solemnly, rising to its feet, "I move that the meeting adjourns for the immediate adoption of more energetic remedies." "Speak English," said the Eaglet. "I don't know the meaning of half those long words, and, what's more, I don't believe you do either!" —(*Alice in Wonderland.*)

THE commonest mode of self-expression is by oral or by written speech. Language is so convenient, so readily understood, and so wide in its range of application, that no other instrument of expression can compare with it in usefulness. Moreover, many abstract ideas would be difficult to express in any other medium than that of words, if indeed we could ever have reached them in the absence of language. The importance of the rôle which language plays in actual life is sufficient reason why the school should place great emphasis upon it, though we may doubt whether the school has kept the idea of *language as an instrument of expression* sufficiently clearly in mind.

It is this aspect of language which Froebel specially emphasized. "With language," he writes, "the effective expression of the internal begins; with language,

organization with reference to means and ends sets in. The inner being strives to make itself known, to announce itself externally. At this stage of childhood . . . the education of man begins." [1] Perhaps it is the neglect of this aspect of language training which accounts for the unequal success which the teaching of English has so far met.

But it must not be supposed that children's inner needs usually lag behind their power of expression, so far at least as the mere acquisition of words and phrases are concerned. They are usually particularly apt in this respect, whether the words mean anything to them or not.

A story is told of Frank Buckland at the age of four, which illustrates their facility in this respect. A clerical friend of his father brought him some "very curious fossils". When they were produced, Dr. Buckland called to his son, who was playing in the room, "Frankie! what are these?" "They are the vertebræ of an ichthyosaurus," lisped the child, and the dumbfounded clergyman returned home greatly crestfallen. The child's words showed, at any rate, that he recognized the fossils as being like others which his father had showed him, but the clergyman was surely mistaken in thinking the words represented any genuine knowledge in the mind of the child.

It is precisely in this sort of thing that the teacher's greatest difficulty lies—a difficulty made all the greater by the fact that the customary measure of the success

[1] Froebel, *Education of Man*, § 28.

of his teaching is so largely verbal. Language has, of course, developed through people having something to say; it is a degradation of language which allows the use of words that carry no intelligible message. Whenever we have a thought and want to express it, we do not usually feel serious difficulty in putting it into words, though we may not be skilled enough to say it briefly or clearly or elegantly. It is when we are not quite sure what we mean, or when we have not been trained to order our thinking, or when we have really nothing to say and are yet obliged to put that nothing into words, that the difficulty of expressive writing and speaking comes. At the same time—the warning may be once again repeated—children readily acquire a verbal acquaintance with the subject-matter of their school work, and it is not always easy for a conscientious teacher to discover the weakness of their knowledge, though he need not make the mistake which Dickens satirizes in *Hard Times*:—

"Bitzer," said Thomas Gradgrind, "your definition of a horse." "Quadruped; graminivorous; forty teeth, namely twenty-four grinders, four eye teeth, and twelve incisive; sheds coat in the spring; in marshy countries, sheds hoofs too; hoofs hard, but requiring to be shod with iron; age known by marks in mouth."

Apart altogether from the worthlessness of mere rote knowledge of this kind, it has an aspect which is positively harmful. The divorce between words and meaning is a mark of insincerity in the use of language. To encourage it in school could not fail to undermine

the sense of personal responsibility which should attach to speaking or writing of any kind.

Children also suffer, in greater or less degree, from certain other special disabilities in the use of language as a means of expression, which it is important that the teacher should understand and appreciate. In the first place, the words which they use and hear often have a meaning quite peculiar to them. A word or a phrase may, of course, stand for nothing at all in their minds, but it also may represent a particular occasion and a particular experience. Words and phrases which are really new to him are accepted as old friends: "sundry finery" becomes "Sunday finery"; "lighten our darkness" is "light in our darkness"; an image is an "idle maid with hands," and the equator is a "menagerie lion running round the world". What child has not wondered why the absence of a city wall should ever have made a green hill remarkable? These are, of course, a child's mistaken interpretations of the verbal impressions he receives from the books and the people around him, and *we* may just as easily misunderstand *him* when he is using words to express his own ideas; he has not mastered their accepted significance, but it is important that we should find out what he means, in order that we may help him to say it in a way which would be generally understood.

In their own narrative children show marked preference for the dramatic and the personal—a fact which comes out with equal clearness in their imaginative drawings; the connecting details drop away altogether,

often with the result that no listener can follow—they take so much for granted. We can, and we must, in some cases, drag these details from them by making them *feel* that they are essential to our understanding.

In thus helping them to make themselves clear, we are teaching them to analyse a complex whole into its several parts, and to put them together again in an intelligible way. A child's power of analysis is relatively slight; the casual detail is as likely to strike him as the significant, to the confusion of his narrative and of his attempts at description. Yet he wishes to be understood, and by convincing him of his failure in that respect we are putting him into the best position for accepting our criticism and guidance. This weakness of analysis comes out very clearly in a child's description of objects. Ask him to describe a knife, he says it is a thing to cut with, a chair is something to sit on, a pen is a thing to write with. The aspect of use makes the strongest appeal to him, but we may not unreasonably require him to look more carefully at the things he uses, and tell us of their appearance and construction.

Incoherence marks his work even when it is clear as far as it goes; he jumps from one point to another, and back again to the earlier points in a characteristic way; he is easily led into side issues because he has no clear idea of the end he wishes to reach. Consider the two following examples of essays by two boys in the same class of nine-year-old children:—

If they know and like the story of Little Goldilocks, they will make up small parties to play the various parts, and the difference between the big and little bear will be decisively marked. They delight in playing shop, and turning handfuls of soil into sugar, small stones into currants and raisins.

To make use of this dramatic "instinct" in children is a helpful way of cultivating their powers of expression. It is particularly useful in literature and history teaching. The children's effort to dramatize brings out in many cases the emptiness of the verbal impressions we have made. Their misunderstandings are often hidden in mere "question-and-answer" revision; their verbal memory is so strong that our phrases, descriptive and other, are reproduced most faithfully. But when they are face to face with the problem of creating the *mise en scène*, we discern how naïve their understanding has been, how full of gaps their knowledge is. Moreover, the effort towards dramatic expression puts them into the spirit of what we have told them in a way which nothing else can; they get a genuine feeling for the human relationships, and for the time with which they are dealing, apart altogether from the exercise in speaking.

Of course, the exercise is most complete and educative when the children themselves work out the whole thing, the teacher standing by as a friendly critic, insisting upon orderly discussion and suggestion. The spirit of the exercise would, however, be lost if it were over-laboured. It is not a public performance that is

thought of, and when our subject has been dealt with satisfactorily in this way, we may well leave it for another.

A typical example may be quoted, which was worked out by primary school children of eleven :—

THE CLOSE OF THE SIEGE OF CALAIS.

1. The story was told in its broad outline.

Introductory—long siege—terrible for people in the town, and trying for the king, who wanted to go home.

(*a*) Terms of surrender offered.

(*b*) Meeting of Calais citizens.

(*c*) Prisoners before the king—Queen's intervention.

2. The children's impressions of Edward, of the people of Calais, of the six citizens and of the Queen were then sought.

3. The "chapters" in the story were suggested by the class, who were then told that it was proposed to play the story through, chapter by chapter. They divided themselves into groups of English and French—a place in the playground was suggested for the city and for the besieging forces. Characters were chosen, and each step in the story was represented.

A lesson of this kind would be difficult for a beginner (and the first efforts of a class in this direction are not usually encouraging to any but enterprising teachers), but the student may profitably watch the work of an experienced teacher, and catch something of the manner and the value of it.

EXERCISES.

1. A series of answers is given to the questions I and II which follow. Consider them with a view to deciding whether they are due to inaccurate ideas or whether they represent correct notions imperfectly expressed, and how you would treat them.

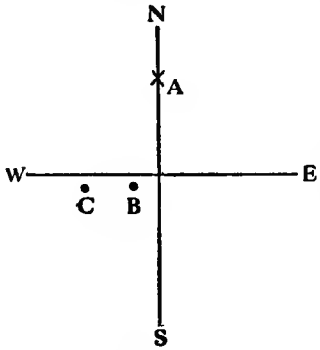


FIG. 1.

I. If you were standing at A, how would you describe the position of B with reference to C? (Fig. 1.)

(*a*) If I was standing at A, I should say that B is a bit more east than C. (Age 10.)

(*b*) If I was standing at the point A, B will be on the positive side of C. (Age 10.)

(*c*) I should look south-west. (Age 11.)

(*d*) I should say that C is one-third of the way from the end of the west line, and B is two-thirds of the way from the end of the west line. (Age 12.)

(*e*) B is in the south quarter, on an horizontal line with C. (Age 13.)

(*f*) B is one-third of the way from the centre to the west, C is one-third of the way from the west to the centre or equator. (Age 12.)

(*g*) B is nearer the equator than C. (Age 12).

(*h*) A is nearer B than it is to C : C is as far west as A

is north; B is one-third west and C is two-thirds west. (Age 13.)

(*i*) A would be as far as B is as far away as A and C is the half as far. (Age 12.)

(*j*) As much distance from the joining of north, south, east, and west as east is from the west, but a little south. (Age 12.)

II. If you are standing in the middle of a room, how much of the room lies north of you? Draw a sketch if you can.

(*a*) If I stand in the middle of a room, one-eighth of the north is facing me. (Age 13.)

(*b*) If I were standing in a room, there is only one spot on the side that is north of me. It is like this. This is the spot. (Age 12½.) (Fig. 2.)

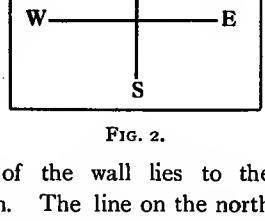


FIG. 2.

(*c*) There is only one part of the wall lies to the north. The line on the north wall is exactly right. (Age 12.) (Fig. 3.)

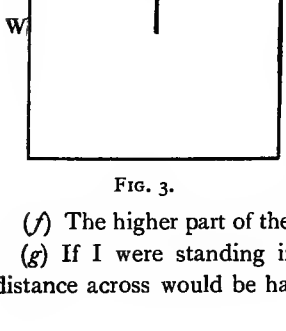


FIG. 3.

(*d*) If I stand in the middle of the room and face the north, all the wall that I could see would lie towards the north. (Age 12.)

(*e*) If I am facing the south, the north is at the back of me. (Age 13.)

(*f*) The higher part of the room would be north. (Age 9.)

(*g*) If I were standing in the middle of the room, the distance across would be half. (Age 8.)

(*h*) Half of the room lies north of me in any case. All that is nearer the North Pole than me. (Age 13.) (Fig. 4.)

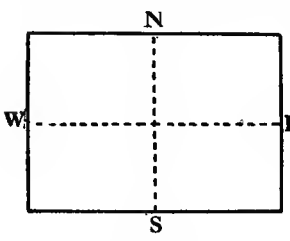


FIG. 4.

2. Examine the two following essays, which are the work of two schoolboys, thirteen to fourteen years of age. What criticisms would you make of them, in order to help the boys to do better in future.

ESSAY I.

Cricket is a game in which one man tries with a ball to knock down one of three pieces of wood which stand upright in the ground near and parallel to each other. Another man with another piece of wood, shaped with a handle, tries to prevent this by hitting the ball, which is meant to do the first man's work. There are several other men round about. Their business is to stop the ball travelling too far when the defender hits it. Now the ball is very hard, and these men often hurt their hands in trying to stop it, but they must not say anything, though they are allowed to shake their hurt hand in the air for a little while at a time. Then too the man who is throwing the ball sometimes hits the defender instead of the pieces of wood. Of course it is this man's fault as he should get out of the way. But it all seems to me a funny sort of enjoyment.

ESSAY II.

Cricket is a delightful game, in which no fewer than twenty-two boys can play at once, not counting two other fellows whose business it is to watch the play carefully and decide when we are not quite sure whether rules have been

broken. Of course there are rules—so many that I do not know them all, but we can generally guess what they ought to be when we are in ignorance—they are very sensible.

I ought to say that there may be less than twenty-two players, but up to that number, the more there are the better. The players are divided into two parties, and each party ought to be about as good at the game as the other. The two groups then play one against the other. I have no time to tell the details of the game, but it is great fun for each one of these parties to be working together to try and do better than the others. Every one is expected to do his best for his side, without thinking about himself, and besides all that, it is a field game for a fine summer day.

3. Place a lead-pencil, an ink-well, a match-box, or other common object before a class of children of nine to ten years of age, and again before a class averaging about thirteen years of age. Ask them to write a careful description of the object, giving them two minutes to think about it before they begin to write. Examine their descriptions, noting specific examples of vagueness, want of analytical power, and failure to distinguish significant from insignificant detail.

4. Draw up suggestions for dealing with the work of the children in the last exercise, so as to bring before them these broad deficiencies.

5. Children of seven, of ten, and of fourteen, have all been to the Zoological Gardens, and are burning with desire to tell you about it. What broad differences would you expect to find in their several stories? Account for them.

6. Take half-a-dozen children of six singly, and ask them to tell you what *star*, *flower*, *God*, *heaven*, *worm*, *field* mean respectively. By questioning them try to draw from them

all that these words stand for in their minds. Write up and comment on the results.

7. Ask six boys and six girls of varying ages to tell you as many single words as they can. Let them go on for two minutes, whilst you take down the words as they are said. Draw up a table showing the number of words given and the age and sex of the pupils. Can you classify the words as concrete and abstract? Do you note any peculiar preferences in individuals?

CHAPTER IX.

EXPRESSION—III.

As long as humanity is humanity, man will yearn to ascend the heights human footsteps may not tread, and long to lift the veil that shrouds the enigma of being, and he will most prize the echo of this longing in even the incoherent expression of literature, music, and art. . . .—(G. F. Watts.)

I regard it as a clear and incontrovertible principle that man is much more truly educated through that which he does than through that which he learns.—(Pestalozzi.)

ALTHOUGH language is so universal and convenient a mode of expression, it is by no means the only one. An architect expresses himself in his buildings, an artist in his paintings, a sculptor in his statuary, and many people find pleasure in other forms of constructive work which are in every sense an expression of themselves. Moreover, a simple drawing or model often expresses our ideas more clearly than any number of words. It is important in itself to cultivate this power of concrete expression in children, not only because of their gain in manual dexterity, but also because they often reach in this way a sense of the inadequacy of their ideas, which fluent verbal expression may hide even from themselves. A boy may have

seen the apparatus for preparing oxygen a score of times, quite often enough, indeed, to enable him to recognize it whenever he sees it, but it is only when we ask him to put it together himself that he realizes the imperfection of his acquaintance with it. Moreover, this kind of activity makes a special appeal to children. It gives them a sense of personal power, and ministers to their instinctive love of activity; they delight in doing and in making things; they find in it a reality which they do not find in words. Further, they can often express themselves in this way long before their command of words is sufficiently adequate to permit of verbal expression. A child can make a respectable model of an apple long before he can describe its shape, and make a drawing of an electric tramcar long before he can tell us effectively what it was like.

Expression of this sort is a recognized feature of every kindergarten, and we are gradually coming to admit its necessity in the upper school. Broadly speaking, it takes two forms. In the first place, we may call for it when we wish our pupils to *represent* some idea concretely, as when we ask them to make a model of a boat in paper, plasticine, or wood, or to represent the fortified village of the Saxons, or to make a square, an isosceles triangle or a cube, or to draw a Norman arch, or, having read the description of a battle, to make a plan of the arrangement of the forces, or, again, to make a comparative drawing of an oak leaf and a beech leaf. In all these cases, there are certain objective

standards by which the results can be gauged. The representation is accurate and clear; nothing more is wanted. Any falling short in either of these respects may be due to want of knowledge or of technique. In the former case, the pupil feels his ignorance, and is ready to learn. In the latter case, he will appreciate the technical exercises which he sees are designed to help him over his difficulties. This, indeed, is the point at which technical exercises should systematically be made use of.

But there is another kind of expression which aims at something quite different from faithful and objectively accurate representation. When the Duke of Westminster commissioned Watts to execute a statue of Hugh Lupus, the artist's first design was intended to express the idea of Physical Energy. Whether the figure represented any particular person did not seem to him to matter. It was a great idea he endeavoured to express in bronze. In the same way when we tell children a story, and ask them to illustrate it with crayon or brush, we give them great freedom, and look for ideas in their work—individuality, we may perhaps call it. Vagueness of idea and want of dexterity will mark their work, but we judge it from an altogether different standpoint. The more freely the child has expressed himself, the richer his work in ideas, the better we are pleased. As we talk to him about what he has done, we show him where his ideas are inconsistent with each other, where they clash with the conditions of the story, and so on,

coming last of all to questions of technical inadequacy. The same principles govern criticism of original written work. A child's creative power needs the discipline of self-criticism, and, to develop that, we are not content to let him be satisfied with everything he does.

At the same time, the point of view from which we criticize is important. It would be wrong to condemn work because it falls far short of adult standards of technique; when the boy's mind is turned wholly in that direction, ideas do not come, and the value of the exercise is lost from the higher standpoint. Equally wrong would it be to allow him to be satisfied with crude workmanship. The problem is how to preserve freedom and, at the same time, to give standards in the actual execution of the work. Whatever he does he must understand; and when he understands, we must encourage him to give his ideas *individual* expression. We must keep in mind the limitation of his powers if we would save him from discouraging disappointment. Perhaps it is legitimate in this place to point out the pitfalls awaiting the teacher who allows school exhibitions to play too prominent a part in the routine of the school. On such occasions visitors admire technical skill, and the pressure of circumstances leads the teacher to give much time and energy to the attainment of technique apart from thought. The teacher supplies ideas, the boys execute them over and over again, until the right pitch of technical excellence is achieved.

The child's attempts to express his own ideas by

drawing are so crude that the teacher is apt to disregard them altogether. He draws up a programme of exercises designed to develop technique. He begins with the elements and carries them through combinations of increasing difficulty. The whole scheme is idealess from the child's standpoint. And at the end of the course, 95 per cent of the pupils have lost all desire to express themselves in this way. All this is so different from the way in which children get control of their speech powers, that it is surprising teachers have not long since abandoned the procedure which owes its origin to Pestalozzi's effort to graduate instruction from its logically simplest elements. Froebel erred in this same way. When children have something to say, let them say it in their own way; they will then under criticism feel the inadequacy of their attempt. Gradually their standards will rise, and under the influence of knowledge aided by intelligent imitation, their skill will increase.

Consider, for example, the following specimens of young children's work. Figs. 5 and 6 are the best and worst examples in an attempt of a large class of twelve-year-old boys to illustrate the story of Gaping Johnny. (In Fig. 5 Johnny is just about to fall over a dog which he does not see, and in Fig. 6, he has just been pulled out of the river.) The coloured plates [1] are reproduced from drawings by six and seven-year-old children in another school.[2] The boys in the first

[1] Plates I and II (Frontispiece and facing p. 110.)

[2] The originals were kindly lent by Mr. H. Tunaley of the Board of Education.

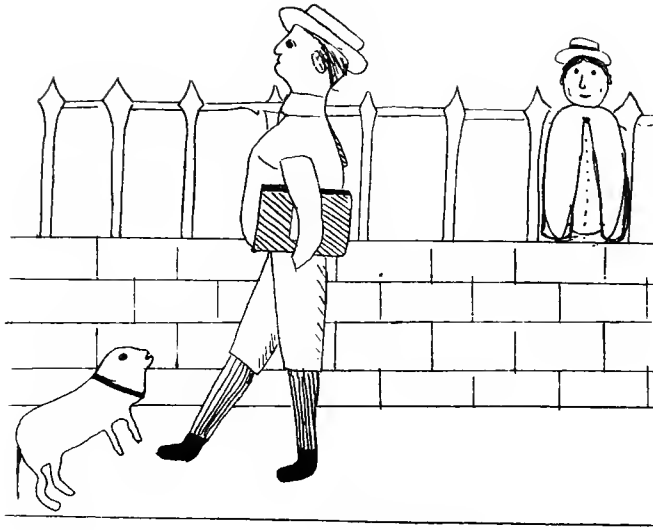


FIG. 5.

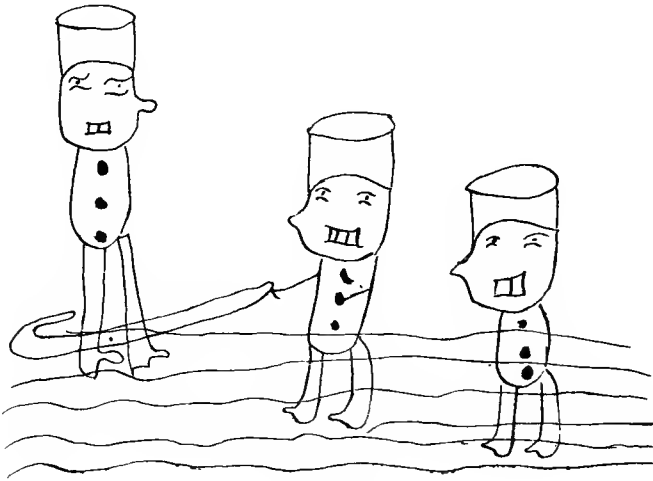


FIG. 6.

PLATE II.

school had had all the usual free-hand drawing lessons but of real power there is no trace. In the other case we see what can be done by very young children under the influence of sympathetic criticism and guidance. They have learned to see objects as they really are, and to represent them with astonishing faithfulness. We may note especially the stimulus and interest which colour supplies.

It is common to confuse what is meant here by expressional work of the second kind with the ordinary school handwork in its common forms—drawing, modelling, weaving, binding, woodwork, etc. The two things ought to be governed by the same principles, for the modern handwork movement arose as a protest against the verbalism of the schools. But we may easily pass from one form of mechanical, mindless school training to another, and, in much of the so-called "hand and eye" training, thought is as conspicuously absent as it ever was in the grind of the old-time classical school. It is true that children learn best by doing—when the doing is intelligent; that is to say, when the purpose of it appeals to them. Handiness, forethought, a sense of mastery over materials, personal pride in work, will all come as a result of work done in response to needs, calls, aims with which the worker himself has a sympathetic understanding.

Handwork, in other words, is not a subject, it is a method, and, as such, it emphasizes the need of providing ample opportunities for the concrete expression of ideas. At the same time, we must not pass to

another extreme, whereby manual constructiveness is magnified by the enthusiastic teacher to an end in itself. In ordinary life, our constructive activities are not practised for their own sake. We are faced with a problem, a need, to satisfy which we set about our construction. A lad does not make rabbit-hutches unless he wants to put rabbits into them. In school the same principle should apply, and a teacher's skill is shown as much in the way in which he creates occasions for free constructive exercises as it is in the variety and force of his methods of actual instruction.

The right attitude of the teacher in these cases will depend upon his clear understanding of the situation at any particular moment. Is it mere representation he is asking for, or is it the higher call that he is making? If the former, he may let his pupils work from memory, to see whether or not their impressions of the object are clear and accurate. The exercise is either preliminary to, or a test of, observation; it brings out the pupils' knowledge or shows their ignorance not only to the teacher but to themselves. It leads also to the desire for increased control over material, for greater technique.

But, in other cases, the interest of the pupil (and therefore of the teacher) is differently centred. Workmanship is important here of course, for the better the workman the more freely and perfectly he can express himself. But in the case of children at school, it is the easiest thing in the world to suppress the struggling idea by a wrong attitude in regard to workmanship.

It is said of the painter Watts, that his "genius was ever struggling with his conscientiousness. . . . At his best he was great as an actual workman, and knew full well that conception and interpretation must agree: feeling that, to a true artist, right expression is the inevitable sequel to a fine idea—that they are inseparable. . . When Byron wrote the line describing love as 'a glory circling round the soul,' he did not wait to think of the best words in which to explain his idea; they came. And so with the painter of genius—study, knowledge, patient enduring labour may form the solid foundations, but when the moment of expression comes, the touch must be inevitable."[1] That "inevitable touch" can hardly be expected of children, but the spirit of Mrs. Barrington's words is pregnant with meaning for the teacher's problem. We wish to give our pupils just this feeling for their expressive work. We want them to see themselves in it, and to refuse to acknowledge work in which they cannot recognize just the thing they wanted to say.

In this connexion we may quote the incident recounted in *Sentimental Tommy* when the hero of the story failed completely in an essay competition, although his rival "could no more describe a familiar scene with a pen than a milkmaid can draw a cow". Tommy produced a piece of unfinished work which "was no more an essay than a twig is a tree, for the gowk had stuck in the middle of his second page". "He had brought himself to public scorn for lack of

[1] Mrs. Russel Barrington's *Reminiscences of G. F. Watts*, p. 34.

a word. He had wanted a Scotch word that would signify how many people were in church, and it was on the tip of his tongue but would come no further. 'Puckle' was nearly the word, but it did not mean so many people as he meant," and the time went by like winking as he thought of all the possible substitutes. None of them would do. "Manzy's a swarm—it would mean that the folk in the kirk were buzzing thegither like bees, instead of sitting still." "Mask," too, he thought of, "but that would have meant the church was crammed, and I just meant the church was middling full". Why not have said 'middling full' then? Tommy wanted one word, the right one, which is as difficult sometimes to find as it is to hit a squirrel, but no other can take its place.[1] The story illustrates admirably the feeling which accompanies all work which is in truth an effort to express ourselves. Browning gives the idea perfect utterance in his *A Death in the Desert:*

> God's gift was that man should conceive of truth
> And yearn to gain it, catching at mistake,
> As midway help till he reach fact indeed.
> The statuary ere he mould a shape
> Boasts a like gift, the shape's idea, and next
> The aspiration to produce the same;
> So, taking clay, he calls his shape thereout,
> Cries ever 'Now I have the thing I see':

[1] J. M. Barrie's *Sentimental Tommy*, ch. xxxvi.

Yet all the while goes changing what was wrought,
From falsehood like the truth, to truth itself.
How were it had he cried 'I see no face,
No breast, no feet i' the ineffectual clay'?
Rather commend him that he clapped his hands,
And laughed 'It is my shape and lives again!'
Enjoyed the falsehood, touched it on to truth,
Until yourselves applaud the flesh indeed
In what is still flesh-imitating clay.

And may we not urge the young teacher himself to catch the spirit of those words in his daily efforts to put himself—his own ideals and ideas—into his struggles with the unceasing difficulties of his own profession.

EXERCISES.

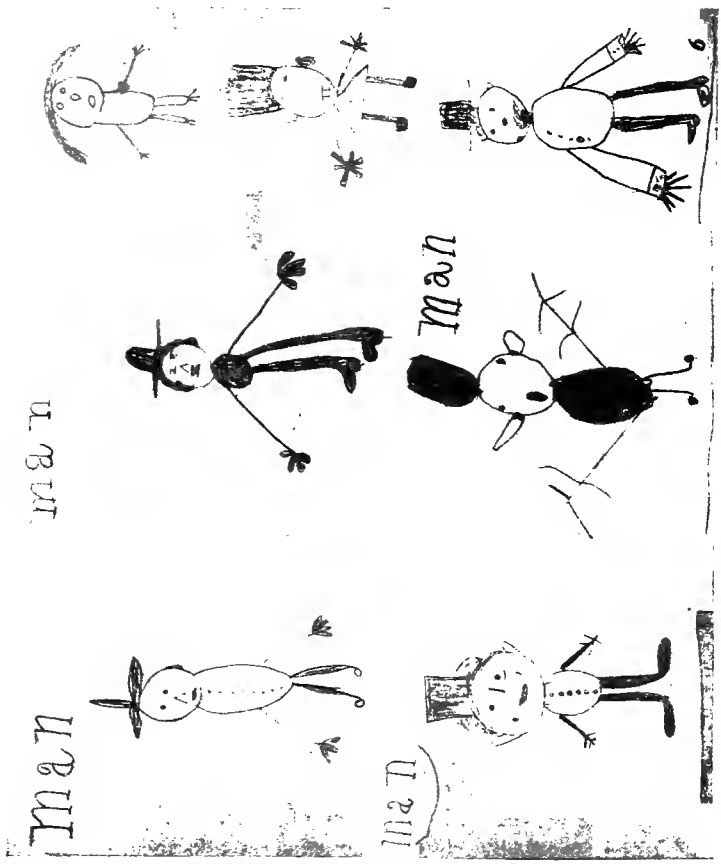
1. Try to represent by a sketch—
   (i) A Norman keep.
   (ii) The plan of your college or your school.
   (iii) A buttercup plant.
   (iv) The east front of your church.

Which can you do most easily? Is it technique or knowledge that is wanting in the cases in which you fail?

2. Tell a class of twelve-year-old children the story of the siege of Calais. Ask them to illustrate it. Examine their drawings in order to find out whether elements quite out of place enter into their conception of the action.

3. One teacher asks children of seven to represent a bird's nest in plasticine or clay, another asks them to do it with coloured crayons. Which is the more satisfactory? Why?

4. Below is a group of six-year-old children's drawings of a man. Are they to be regarded as representations of the



human form as children see it? Is it knowledge or technique the children lack?

5. An upper standard in a primary school has been studying the geography of North America with a good orographical map. Give them an outline map and a piece of plasticine, and ask them to represent the general features of the surface. What misconceptions do you find?

6. The Christmas holidays are approaching, and your class hears again the message of "Peace on earth and good will to men". What possibilities of giving practical expression to the emotions amongst the children can you suggest?

7. What school institutions do you know which owe their value to the opportunities they give for the practical expression of the love of service?

8. A class has been studying the "Merchant of Venice". The teacher asks them to write a letter from the Prince of Morocco to his friends, after his failure, or from Shylock after the trial. What would be the value of such an exercise?

9. What is there of substance in the criticisms implied in the following verses?—

My little boy is eight years old,
  He goes to school each day;
He doesn't mind the tasks they set—
  They seem to him but play.
He heads his class at raffia work,
  And also takes the lead
At making dinky paper boats—
  But I wish that he could read.

They teach him physiology,
  And oh, it chills our hearts
To hear our prattling innocent
  Mix up his inward parts.

He also learns astronomy
And names the stars by night;
Of course he's very up-to-date,
But I wish that he could write.

They teach him things botanical,
They teach him how to draw;
He babbles of mythology
And gravitation's law;
The discoveries of science
With him are quite a fad.
They tell me he's a clever boy,
But I wish that he could add.

—(Peter McArthur, from *Idols*, by Chas. M. Gayley.)

CHAPTER X.

IMITATION.

Nous disons donc qu'une société est un groupe de gens qui presentent entre eux beaucoup de similitudes produites par imitation ou par contre-imitation.—(M. Tarde.)

WE all recognize our tendency to imitate whenever we are placed in a new social environment. We feel a desire not to make ourselves conspicuous, we wish to avoid *faux pas*, and therefore watch carefully how other folk behave. In the same way, we follow fashion in dress, or set out to learn a much-admired stroke in billiards, or read a book which everybody is talking about. Our imitation in all these cases is deliberate ; it comes from a conscious desire to be like other people. But we imitate very often without being aware of the fact, and many of our personal habits have their origin in the native tendency to behave like the people about us. Our attitudes towards others, our standards of taste in art and literature, our political beliefs, our hobbies, many of our ways of looking at things come from the people amongst whom we were brought up, although there may have been little or no definite teaching. What is vaguely called atmosphere, and the imitative response thereto, is largely respon-

sible. It is because of this innate tendency to respond to the influences around us that we hear so much of the environment plea in education. We learn to like good pictures by living in their midst, to speak with a good accent by hearing it from the cradle, to honour those things which are honoured at home, and at school, and amongst our friends. The teacher is constantly calling upon his children to watch him or listen to him when he is concerned in their acquisition of some dexterity, but he is apt to overlook the more subtle workings of the tendency to imitate.

Thring's whole work at Uppingham shows how deeply he realized its importance.

"Another grave cause of evil in schools," he says, "is the dishonour shown to the place in which the work is done. Things are allowed to be left about, and not put away when finished with. Great roughness is permitted in the treatment of the room and its furniture. Yet there is no law more absolutely certain than that mean treatment produces mean ideas; and whatever men honour they give honour to outwardly. It is a grievous wrong not to show honour to lessons and the place where lessons are given."

And again: "I unhesitatingly assert that my own work has succeeded with the many just because God gave me a spirit of freedom to attend to fringes, and blue, and purple, and scarlet ribands, and Pompeian red and autotypes, and boys' studies, and the colour of curtains to their compartments, and a number of little things like that".

In the social life of the school we see the force of imitation in the growth of school traditions, in what we call *esprit de corps*, and in the influence exerted by the older boys upon the rest of the school. It is also the prime motive force in bringing about school reforms. The ideas of a strong personality find acceptance, often without any logical justification. Gradually the spirit which inspired the reformer is lost, and the mechanism of his changes remains, not infrequently a veritable hindrance to the development of the spirit of freedom amongst teachers. Pestalozzi, Froebel, and Herbart are conspicuous examples of great educational thinkers whose influence for good has suffered in this way. It is easier to imitate than to think, and it is human to take the line of least resistance. We do this unconsciously. A young teacher watching a demonstration lesson should be aware of this danger. Critical analysis is wanted. The spirit of the demonstrator may be caught without falling into the error of supposing that the actual procedure is capable of imitative transference to any and every situation. Demonstrations are meant to stimulate individual and independent thinking, not to lead to uncritical imitation.

We see the subtle working of imitation again in the sympathetic response which we give to cheerful or melancholy surroundings. Smiles and tears are alike infectious. An atmosphere of gloom lowers our vitality, and with the increase of numbers the effects upon individuals become more and more pronounced. The

mad acts of a riotous crowd, the enthusiasm of a great audience under the spell of oratory are cases in point. A cheery optimistic teacher, who brings his love of the fresh air, of the fields and woods, into his classroom will touch vital chords of sympathy in the minds and hearts of many of the boys whom the dry-as-dust pedant will never move.

The young teacher must bear in mind at once the importance of this tendency to imitate, and the variety of forms which it takes; it is easy to distinguish and to take account of conscious and purposeful imitation, but the unconscious form which springs from inborn tendencies to adapt ourselves to our environment is more easily overlooked.

Children are notorious imitators. It is a provision of nature which enables a child to fit himself rapidly into his surroundings. He has not the established habits and interests which largely restrict the imitativeness and adaptability of his elders. We see it, of course, most clearly in children's play, in which all their most striking experiences are reproduced with an imaginative resourcefulness which is inexhaustible. Nothing seems to escape them,

> "A wedding or a festival
> A mourning or a funeral;
> And this hath now his heart,
> And unto this he frames his song:
> Then will he fit his tongue
> To dialogues of business, love or strife;

But it will not be long
Ere this be thrown aside,
And with new joy and pride
The little actor cons another part;
Filling from time to time his 'humorous stage'
With all the Persons, down to palsied age
That Life brings with her in her equipage;
As if his whole vocation
Were endless imitation."

Hence the importance of imitation as a starting-point in education. It is an inner factor in the child which the teacher must make conscious use of.

The greater the teacher's prestige in the mind of the child, the more will he be imitated, especially in those things about which he is keenest. His interests, his personal behaviour, his way of looking at things, will pass over to his class. Arnold of Rugby affords a classical example of the truth of this that the young teacher would do well to study. He himself will remember how he caught enthusiasms from the best among his old teachers. And so, in turn, his keenness for games, his love of the country, his literary enthusiasm, will be reflected in his class. He is a mechanic indeed, whose boys do not carry away from intercourse with him some trace of personal enthusiasm. The student must remember, too, that imitation at this stage is not selective in a moral sense. The careless, unenthusiastic, slouching teacher will affect his boys deleteriously, unless they dislike him for his bad temper or other worse vice, when he may set up what is called counter-

imitation—a source of danger which also attends the teacher who is priggish in his treatment of boys' misdeeds. A great deal depends on the boys' sense of what is expected of them. The change a temporary teacher may produce in lowering the standards in children's minds is often extraordinary. Compare the following specimens of writing,[1] done by the same child on successive days, the first with the ordinary class teacher, the second with a careless new-comer in charge. He was not what is sometimes called a weak disciplinarian, nor was he otherwise incapable. It was just the result of an it-doesn't-matter attitude, which the class was quick to take up.

We must now consider the more formal use which teachers make of imitation. They call upon their boys to imitate whenever they are concerned with the acquisition of skill in some form or other. As we have already said, it is the importance of this aspect of our subject that leads us to overlook other aspects which are not less important, because they are less under our control. Thus it is resorted to as an aid in gaining technical skill in writing, drawing, modelling, in physical exercises, indeed, in work of any kind where complex movement is involved. Similarly, for clear speaking, whether in our own or in a foreign language, imitation is imperative. The very mould in which our thought is cast may be deliberately taken from a favourite author, and in the senior school we may ask our pupils to write an essay in the style of Bacon, or Addison, or Macaulay, and so on.

[1] Figs. 8 and 9 (pp. 126 and 127).

It sometimes happens that pupils imitate when originality would be preferable. This is particularly likely to occur if the teacher himself is not quite clear where imitation as an educational instrument should stop, and where the children should be allowed complete freedom to do the best they can—a problem which can only be answered in general terms. The teacher should have regard to the end in view rather than to any stereotyped method of producing a particular result. The ultimate end is freedom and power. Thus, in drawing, for example, we shall not teach conventions and tricks in order to make an imposing show. We cannot, of course, be indifferent to results, but we must remember that the work is the work of a child, and should not, therefore, be judged from an adult standpoint. It is, in most cases, not the result, but the way the child has reached it which is really important. With the growth of critical power in the child, results will come all right; but the younger the child is, the less does the end in view, in any critical sense, interest him. Let us pause for a moment to study what Rousseau has to say on this point, for though he overstates his case, his remarks have a real value, and are not so exaggerated as at first they may appear:—

Children, who are great imitators, all try their hand at drawing. I would have my pupil cultivate this art, not exactly for the art itself, but for rendering the eye accurate and the hand flexible; . . . I shall take great care not to give him a drawing master who will give him only imitations to imitate, and will make him draw only from

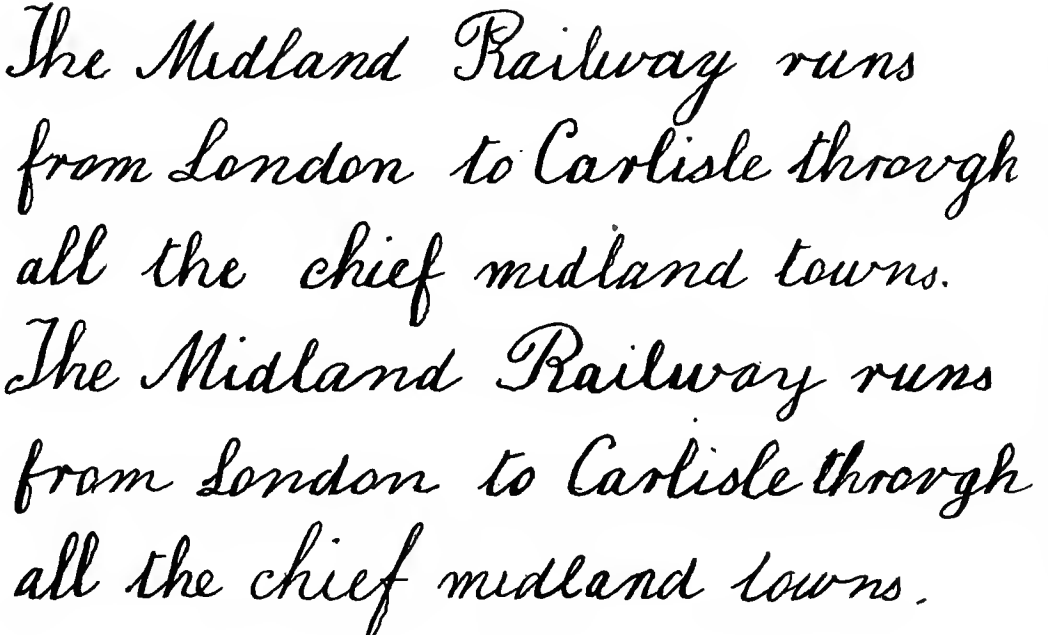

The Midland Railway runs
from London to Carlisle through
all the chief midland towns.
The Midland Railway runs
from London to Carlisle through
all the chief midland towns.

FIG. 8.

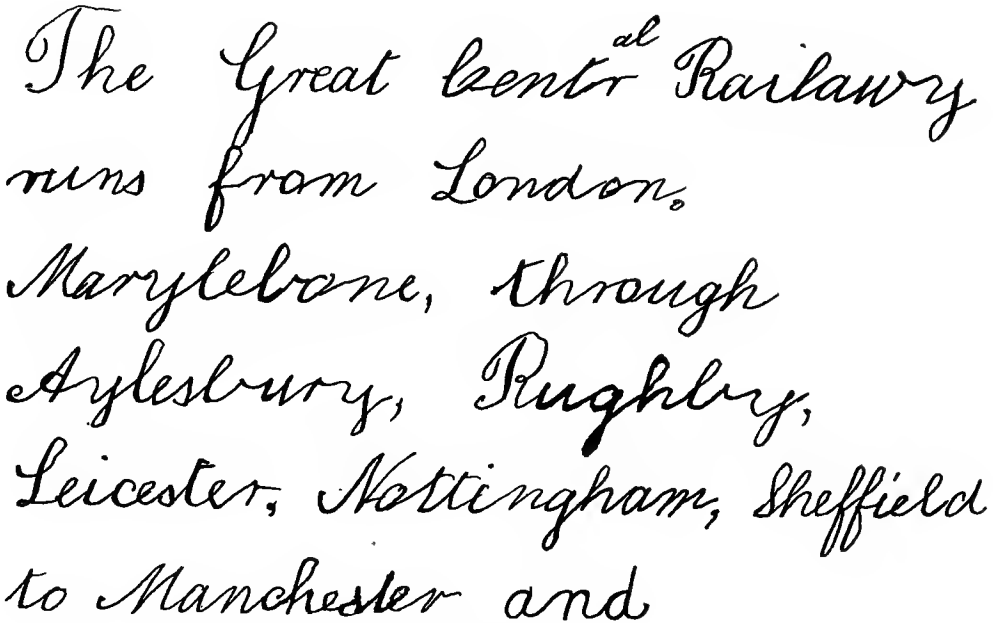

The Great Central Railway
runs from London,
Marylebone, through
Aylesbury, Rugby,
Leicester, Nottingham, Sheffield
to Manchester and

FIG. 9.

drawings. He shall have no master but Nature, and no models but objects. He shall have before his eyes the very original, and not the paper which represents it; he shall draw a house from a house, a tree from a tree, a man from a man, so as to become accustomed to observe bodies and their appearances correctly, and not to take false and conventional imitations for real imitations. . . .

I am well aware that, in this way, he will scrawl for a long time, without making anything that is recognizable: that he will be late in catching the elegance of contours, and the light touch of designers, and perhaps never a discernment of picturesque effects and good taste in drawing; but, by way of compensation, he will certainly contract a juster glance of the eye, a steadier hand, a knowledge of the true relations of volume and form existing in animals, plants, and natural bodies, and the more ready use of the play of perspective. . . .

Besides, in this exercise, as in all the others, I do not intend that my pupil shall have the enjoyment of it all to himself. I wish to make it still more agreeable to him by always sharing it with him. I do not wish him to have any other rival than myself; but I shall be his rival without respite and without risk: and this will put interest into his occupations without causing jealousy between us. In holding the pencil, I should follow his example; and, at first, I shall use it as awkwardly as he does. Were I an Apelles, I would appear to be no more than a dauber; I shall begin by tracing a man, just as lackeys trace them on walls—a stroke for each arm, a stroke for each leg, and the fingers larger than the arms. After a very long time, we shall both take note of this disproportion; we shall observe that a leg has thickness, and that the thickness is not the same throughout;

and that the arm has its determinate length with respect to the body, etc. In this progress, I shall do no more than keep up with him, or I shall advance so little beyond him that it will always be easy for him to overtake me, and often to surpass me. We shall have paints and brushes; and we shall try to imitate the colours of objects, and their whole appearance, as well as their form. We shall colour, we shall paint, we shall daub; but in all our daubing, we shall not cease to watch Nature; we shall do nothing save under the eyes of the master.[1]

We cannot, of course, follow Rousseau's plan in detail, because we are dealing with numbers, but the stimulus which he finds in the mock rivalry of teacher and taught comes from the legitimate rivalry between the pupils, all of whom, as it were, start from scratch. The cleverer boys teach by their example those who are not so well endowed. Other boys learn from them by imitating their mode of procedure, but blind copying, in any case, is of little value. Imitation is only fruitful when we resort to it from a felt necessity, and this is the lesson Rousseau would teach. How false it is, then, in a drawing-lesson to place a copy before a class, and get the children to imitate the teacher line by line, or brush-stroke by brush-stroke. It yields results which may deceive the unwary, but what value in terms of power does it bring to the pupil? He can draw nothing unless he follows another. Nor is it much better to treat an object in that way. We should rather give the young child some simple object to represent with

[1] Rousseau's *Emile* (Payne's translation), pp. 107-9.

crayon or pastel. When brush-drawing is begun we shall show the child how to hold his brush, and let him imitate us; then we shall set him to represent something that he can understand and has a feeling for, instead of allowing him to practise "flatwash" laboriously: which ends in skill in flatwashing, but in nothing more. Practice enough will arise in the course of his attempts to represent objects, and, in face of his difficulties, the boy will be the readier to learn; he will imitate deliberately now in order the better to accomplish his object. When he has tried himself, and felt his shortcomings, he will be in a better position to receive suggestions and criticisms. He will watch our *methods*, and imitate them in order to accomplish the particular aim he has set himself. His teacher's actual drawing is of no use to him; it does not suit his needs.

Like questions arise in such exercises as reading, writing, and composition. Pattern reading is now generally condemned on grounds analogous to those considered above. It gives results which are monotonously hard and painfully superficial, though the effective reading aloud of continuous passages for the enjoyment of the class provokes imitation of quite the right kind.

Much the same remarks apply to the teaching of writing. To insist on a uniform style of writing is pedantic. Children must learn to hold a pen to write with the minimum amount of fatigue to themselves, and their letters must conform to accepted script, and also, the general result should be at once neat and

legible, but, beyond that, children should be given the utmost freedom.

The rule is: Have regard to the real end towards which you are working—an end in which society in general is interested—and do not think of any stereotyped way of reaching it. Remember, too, that the younger the child is, the less does such an end interest him. We must find things for him to do which appeal to him, and we must avail ourselves of his difficulties to give direct instruction as to ways and means of overcoming them. His imitation will then be thoughtful and educative. Of course, in a subject like physical exercises, deliberate imitation is necessary from the outset; but it is a mistake to think we are teaching arithmetic when we work a particular problem, and set the class to work similar ones. Growth of power in arithmetic means growth of power to analyse a problem. Skill in the mere manipulation of figures is only a matter of practice. Similarly, it is a mistake to think we are teaching children how to express their own thoughts, to write composition in fact, when we first work out the composition orally with the class, and, after having written it on the blackboard, set them to write for themselves on the same topic.

In leaving the subject of imitation, it should be unnecessary to remind the young teacher how dangerous it is to allow a too free and easy attitude to creep into the routine of class management. Quiet gentleness of manner—which does not mean want of firmness—tidiness and orderliness in his own doings, are neces-

sary conditions of success, if he wishes to see these virtues in the working of his school. These and similar points are further referred to in the chapter on Suggestion.

EXERCISES.

1. "Example is better than precept." Consider this in relation to the following cases :—

(*a*) Children coming to school in a dirty condition.

(*b*) Boys learning to swim.

(*c*) Discourteous habits.

(*d*) Teaching punctuation.

(*e*) The "vice" of copying.

2. Why does a boy learn French better by residence in France without systematic teaching, than by systematic teaching on the direct method at home?

3. "Roughness of manner in masters begets bullying amongst the boys." Is this necessarily so? Give reasons for your answer.

4. What personal qualities in the teacher, imitatively reproduced in the individual members of the class, will conduce to smoothness and efficiency of classroom work, and vice versa?

5. What do you understand by intelligent imitation? Give examples of unintelligent imitation from ordinary and from school life.

6. Consider how you would take a class of seven-year-olds and a class of twelve-year-olds in the drawing of a daffodil from nature. What difference would you expect to find in the results, and in the children's attitude towards those results? What part would imitation play in such an exercise?

7. A child of three is eager to write a letter, a boy of ten is commonly distressed at the idea. Why is this? Are boys of ten less imitative than boys of three?

8. To what forces is public opinion due? How does this apply to school?

9. Distinguish between imitation and mimicry. Is it ever legitimate for a boy to mimic his teacher?

10. Imitation secures uniformity, and to insist on uniformity kills individuality, but, without approximate uniformity class teaching is impossible. Consider this in the light of school instruction in reading, arithmetic, chemistry, woodwork, and needlework.

11. A teacher demonstrates the method of preparing oxygen, giving detailed instructions as to the method of fitting up the necessary apparatus, and sends his boys into the laboratory to do it. What is the educative value of such an exercise from the standpoint of imitation?

12. How would you teach boys the art of correct phrasing in reading aloud, avoiding the pitfalls that accompany what is known as pattern reading?

CHAPTER XI.

INFERENCE.

WE have in previous chapters considered typical instances of instruction in which the teacher's object was to add directly to his pupils' knowledge. The art of narration and of description lies in doing it in such a way that our pupils are eager to learn. Incidentally, we set up also a desire for clearer and fuller knowledge in various directions, thereby giving definiteness to curiosity, making it in fact intelligent. Sometimes, however, we wish our pupils to take a step beyond the things we have told them or shown to them, to some truth for which these facts are more or less convincing evidence. It may be so simple a case as that in Thackeray's story of the priest. "An old Abbé, talking among a party of intimate friends, happened to say, 'A priest has strange experiences; why, ladies, my first penitent was a murderer'. Upon this, the principal nobleman of the neighbourhood enters the room. ''Ah, Abbé, here you are; do you know, ladies, I was the Abbé's first penitent, and I promise you my confession astonished him!'"[1] Or, having demon-

[1] Quoted by Bosanquet, *Essentials of Logic*, p. 140.

strated the fact of air pressure, we expect our class to suggest some sort of explanation of the common pump and the barometer. We wish them to draw conclusions; in other words, to make inferences, as the logician would say.

Making inferences is, of course, no new thing to children. They are constantly drawing conclusions, just as grown-up people are, without knowing exactly what it is they are doing. The persistent Why? is not always a search for a reason, but it often does reveal an inquiring spirit, and the small child's behaviour is frequently governed by very sound practical judgment. If he has been frightened by the ardent caresses of a big dog, he avoids close contact with like creatures in future; he addresses his requests with great shrewdness to the persons most likely to grant them. In cases of the kind, there is no formally expressed ground for his conduct. Instances of the same sort of thing occur long before he is articulate. He cannot say, and does not think "all big dogs are dangerous," "nurse always gives me what I want". If he could, we should say he had made an assertion the truth of which went beyond the facts of his experience. As soon as he can talk freely, we find this is a common occurrence. Of course, it is generally concerned with doing things, but doing things is the business of life to children.

"And now," said Edward, "who's to ask Farmer Larkin? *I* can't; last time I saw him, he said when he caught me again he'd smack my head. *You'll* have to."

The same graceless youth, speaking of girls, says: "They don't *know* anything; they can't *do* anything—except play the piano, and nobody would want to talk about *that;* and they don't care about anything—anything sensible, I mean." [1]

Precisely the same tendencies are familiar features in the conduct and conversation of older people. "I never buy eggs at that farm, they are always bad," says a lady who has had one or two disappointments there. Even on a fine morning we tap the barometer before we decide to leave our umbrella at home, because we have heard that a falling barometer means rain. Like children, too, we often speak or act in this way without being at the time conscious of the reason, and often enough, when challenged, we find our reasons singularly inadequate.

A casual glance at the examples already given will show that inferences lead us in two opposite directions. We buy unsatisfactory eggs twice from one person, and declare that his eggs are always bad. Here we jump from one or two experiences to a statement quite general in character. We believe that a fall of the barometer means a change of weather, and though the sun is shining, we take an umbrella as the result of our morning inquiry. In this case, we apply a general principle to the circumstances of the moment. We call these two kinds of inference Induction and Deduction respectively.

[1] Kenneth Grahame, *The Golden Age.*

INDUCTION.

The example of induction already given illustrates a natural tendency to generalize, common to mankind; most of our proverbs are familiar examples of popular generalizations, though when we say "the burnt child dreads the fire," there is a wealth of experience behind it which lifts the generalization into a very different plane from that which the boy reaches when he declares that girls can do nothing except play the piano. Yet a single experience *may* lead us to a general conclusion which is perfectly true, though the soundness of a result does not of itself justify the procedure. In most cases, conclusions drawn from solitary individual experiences are seriously wrong; insufficiency of data is a prime source of error in the generalizations which are common in ordinary intercourse, and the business of the teacher is to discipline the native tendency to generalize too soon.

Children are naturally impatient of doubt and uncertainty, but they must be taught to suspend their judgment, and to see the difference between what they have actually experienced and what they have based upon it. They must learn what it is to be quite sure of their ground, and, although they may in the meantime speculate on the way things are going, they must often be led to feel the need of further evidence such as will turn their intelligent guesses (hypotheses, as the logician would call them) into accepted truths, or lead, perhaps, to their being abandoned.

It is not, however, merely a case of accumulating evidence. A farmer who believes that the moon governs the weather will tell you he has noticed it all his life, and he will find a dozen other farmers who confirm his observations. It is equally important to examine the nature of the evidence with a view to its right interpretation. If we start with a preconception like that of the farmer in relation to the weather, we shall usually find abundant evidence to support it, until somebody points out another possible way of regarding things. When the moon changes four times a month, and the weather nearly every day, it would be curious if the changes in moon and weather did not frequently synchronize.

Outside the field of mathematics, there are relatively few generalizations which are capable of satisfactory proof in school. We read in textbooks a good deal about inductive teaching, but the word is used to cover many lessons which, although based on the idea of induction, fall very far short of the logical ideal. We may, by a series of illustrations, lead a class to the generalization that, other things not interfering, gases expand with a rise of temperature; but, although the result is true, in practice, it is often reached after the consideration of only one or two cases—a procedure which hardly justifies a statement about all gases. In cases of the kind, the teacher should frankly *tell* his class that what is true of coal gas and air is true of all gases, but that time will not allow the study of more examples. The pupils should not be led to

think the generalization has been proved. They have the teacher's word for it, and they may abandon it as soon as it does not square with facts.

It is of the greatest importance that the teacher should himself be quite clear as to what general statement follows from the things he has brought to the notice of his class. Clear-headedness is an essential quality of good teaching, and we cannot expect our class to be clear in their minds if our own thought is confused. Even when it does not seem to matter very much, it is best to be scrupulously accurate in the way we put things. A teacher is, for example, giving a first lesson on adverbs. He adopts the customary plan of presenting a series of simple statements like *He can write*, *Father is speaking*; he compares these with, *He can scarcely write*, *He can write easily*, etc. What is the inference? *Not* that adverbs are words which modify the meaning of verbs, but that we often alter (or modify) the meaning of verbs by inserting another word in our statement. He follows that up by saying that words used in this way are called adverbs. In a later lesson he treats cases in which adjectives are similarly affected, and tells again that the name adverb is also given to words which modify the meaning of adjectives. Finally comes the case of adverbs themselves under modification. Now he is ready for the final generalization, which takes the form of the definition of the adverb.

Whenever it is possible to make the procedure of our lesson completely logical, and, at the same time,

to keep within the limits of our pupils' powers, we ought to do so. The student is recommended to watch carefully all the science lessons he can from this point of view. He will find in many cases that the inductions (generalizations) are logically faulty; that the data upon which they are based are too scanty to warrant the conclusion. The generalization is probably true enough, but it did not follow from the evidence. It would have been better to have made this clear to the class. This does not mean that the lesson should begin with the generalization, and that we should follow this up by illustrative cases, but the mere fact of presenting special cases first does not make the resulting generalization a satisfactory induction.

An inductive procedure in teaching may be sound from the logical standpoint, and yet be inefficient when it is applied to the case of children. It may involve steps which their immature minds cannot grasp. What is sometimes called "the typical case method" is an instance. "What we set out to prove is proved in this particular example, therefore, it is universally true of those things of which this is a type." We are to prove that the angles of any triangle are together equal to two right angles. We show that it is true of a particular triangle A B C, and follow this up by a "wherefore" which embraces all triangles. Teachers of geometry nowadays make the child measure a large number of triangles of all kinds until he is "practically" convinced of the truth of the statement that the angles of a triangle are together equal to two right

angles. They recognize that he is too young to *feel* all that is implied in that "wherefore" with which Euclid's propositions properly close.

Again, we would urge that it is more important to train our pupils to observe and to record facts accurately than it is to hurry them into induction or the appearance of it. "Beware of generalization" is a better doctrine for the primary school than another which has taught that our lessons should always lead up to a generalization. Ultimately, we may get there, but it is not in many cases that school will furnish sufficient opportunity for the pupils *themselves* to arrive at certitude of a general nature. We may and must often *tell* them general truths, but we should teach them steadily to distinguish between what they know on authority (with more or less supporting evidence) and what they know at first hand. "Higher up in the school we may profitably cultivate a critical attitude towards authority itself. The study of history offers opportunities for useful work of this kind, which should not be neglected."[1]

DEDUCTION.

We must distinguish what has been said above about induction and inductive procedure in teaching from what we have said previously about explanation. Strictly speaking, explanation consists in showing that such and such is a special case of a general principle

[1] *V.* Keatinge, *Studies in the Teaching of History.*

already known to the children. If, however, the general principle itself is new, we may proceed in a quasi-inductive way to expound it. The distinction may, perhaps, be marked by the difference between the words Explanation and Exposition. Thus we may *explain* the circumstances affecting climate by reference to scientific principles like that of latent heat, expansion of gases, etc., or, if nothing is known of these principles, we give an expository course on climate, in which these principles are themselves first demonstrated by the customary method of illustrative experiments. The student may estimate for himself how far *proof* is really possible in this case.

Granted the general principle, the question of its application to special cases is one of deduction. We have seen that, at certain places in inductive procedure, the illustrative cases chosen by the teacher suggest a general principle, and that the teacher in his wisdom may think it right to lend his authority to that general principle. He should not, however, stop there, not merely because he needs to take all precautions to fix the matter in his pupils' minds, but also because it would be logically still more incomplete than his previous procedure at its worst. The class must be taught to put their generalizations to the test, and to keep their minds sufficiently open to see an adverse result whenever it occurs. This two-fold process—suggesting an explanation and putting it to crucial test—is well illustrated in the story of the barometer.

In the year 1640 a Florentine pump-maker observed that his lift-pumps would not raise water to a greater height than thirty-two feet, and consulted his great townsman Galileo as to the cause of this phenomenon. Galileo does not appear to have given the correct solution, as he compared the water column to an iron rod hung up by one end, which, when long enough, will at last break with its own weight. Torricelli, however, in 1643, made an experiment which gave the true explanation of the pump-maker's difficulty. Filling with mercury a glass tube three feet in length, and closed at one end but open at the other, he closed the open end with his finger, and inverted the tube in a basin filled with mercury. The mercury then sank in the tube to a certain level, whilst above this level there was an empty space, which is still called the Torricellian vacuum. Above the mercury in the basin was water, and Torricelli then raised the tube so that the open end came into the water. The mercury then flowed out, and the water rushed up, completely filling the tube. . . . The rise of mercury or water in a vacuous tube is caused by the pressure of the atmosphere; the water is, however, 13·5 times lighter than the mercury, and hence the column of the former liquid which it supported by the atmospheric pressure is 13·5 times as high as that of the latter liquid. Thus was the *barometer* discovered. . . .

Hearing of Torricelli's discovery, Blaise Pascal resolved to put this theory to a further test. If, argued he, the suspensions of the mercury in the barometric tube are due to the pressure or weight of the air, the mercurial column must sink when the barometer is taken to the top of a mountain, owing to the pressure on the mercury being lessened. Unable to try the experiment himself, Pascal instructed his

brother-in-law, Périer, to ascertain whether this was so or not, and on 19 September, 1648, Périer took a barometer to the summit of the Puy-de-Dôme, and showed that the mercury sank as he ascended, proving conclusively the correctness of Torricelli's explanation.[1]

In exposition we must follow this double line of attack. When the original hypothesis has been confirmed in various ways, the generalization becomes a tool for deductive thinking, which we may expect our pupils to use either—

1. To anticipate what will happen under circumstances which, though they lie outside their actual knowledge, are known to involve these principles; for example, knowing the general conditions that determine climate, the extent of the Island of Madagascar and its position on the globe, they may try to deduce the climate of the island. In the teaching of history, general knowledge of human nature and of particular circumstances will sometimes enable them to foresee the course of events; or—

2. To explain particular facts as they come across them. They find, for example, that nearly three-quarters of the barley grown in Ireland is produced in the south-east; they explain it by reference to the climatic and soil conditions which favour that cereal all the world over.

It sometimes happens that mistakes are made in the actual process of Deduction. It is important, therefore, to see that our deductions are supported by the facts. It does not follow that general principles are wrong because attempts to deduce the climate of

[1] Roscoe and Schorlemmer, *Treatise on Chemistry*, Vol. I.

Madagascar prove unsuccessful when the results are compared with the facts as given in books.

So far as actually arriving at the general principles is concerned, we have already suggested that children are too ready to jump to general conclusions on insufficient evidence, and that, therefore, it is important to lead them to see the world of difference between what is proved and what is merely hypothetical. The teacher's choice, when dealing with subjects in which general principles must be made use of, lies between (1) telling his class the general principle first, and giving illustrative examples, and (2) holding back the general principles until they have come across a series of difficulties (or particular cases) in their actual experience, which demand an explanation. He is largely in control of their experience, and his skill will be shown in his choice and arrangement of it.

Obviously the former method, the deductive method, is quicker, but it is open to various objections. In the first place, it encourages reliance upon authority, and discourages the critical and self-reliant attitude of mind which it is the business of the teacher to foster. In the second place, it is often too much a matter of words and rules.

EXERCISES.

1. Consider the following statements, and determine (*a*) how much they contain which goes beyond the evidence of the moment; (*b*) how much of the evidence lies in your own experience; and (*c*) how much rests on authority:—

(i) Dogs are admirable companions.
(ii) My bag weighs sixteen pounds.
(iii) I see you are in mourning.
(iv) What an excellent lawyer you have employed.
(v) He has not shaved this morning.
(vi) New York is *the* city of the future.
(vii) England and Wales contain 58,400 square miles.
(viii) Edward VII is rightly called *The Peacemaker*.
(ix) Magna Carta is the foundation of English liberties.
(x) That plant is frost-bitten.
(xi) $(a + b)\ (a - b) = a^2 - b^2$.
(xii) Water freezes at 32° Fahrenheit.
(xiii) King John is the most disreputable amongst English monarchs.
(xiv) A stitch in time saves nine.
(xv) That church must be two miles away.

2. Place two circles on the blackboard, each of six inches radius. Write the number 168 in one and 187 in the other. Ask your class which is the larger circle. Try this through a school, and count the number in each class who say the circle with 187 inside is the larger. What do you notice about the results as you go up the school? How do you account for the inference?

3. On what grounds does a speaker infer that a member of his audience who looks at his watch is getting bored?

4. A teacher infers that a boy who turns his eyes away is not listening. Is the inference a just one? How might he test it?

5. A teacher demonstrates the fact that a copper bar and an iron ball expand when heated. What *practical* inferences follow? What *general* conclusion is often based upon this evidence?

6. Six honest people say they have seen a ghost in a certain house. Would you be satisfied? If not, why not?

7. Consider critically the following questions:—

(1) How many farthings are there in a shilling? Then, if you call farthings shillings, you multiply by—?

(2) Is the answer to be larger or smaller? Shall we multiply, therefore, or divide?

(3) We saw that the glowing splinter burst into flame when we put it into a jar of oxygen; we know that when we blow air through a fire which is burning low it gradually gets brighter. What then do you think there must be in air? Should you think oxygen and air are the same thing? Why not?

8. How would you teach children the difference between Certainty and Probability, Authenticity and Reliability? At what age might you expect them to grasp the distinctions involved?

9. Teachers are generally advised not to ask questions which require a simple Yes or No for an answer. Why?

10. Make a note of all the questions in a history lesson that call for inferences from the class. Set out the ground on which inference would be possible in each case.

11. Examine the following notes of a lesson on iron with special reference to the inferences and the evidence upon which they are based.

IRON.

Things required—Nails, hammer, poker; pieces of iron and wood of equal size; water; iron rod and piece of glass tubing about same diameter; heavy weights; iron and lead tubing of about same diameter; fire, sheet-iron, iron wire, piece of rusty iron, lead, iron spoon, magnet, penny, shilling, iron filings, sand.

Observations and Experiments.	Results.	Inferences.
1. (*a*) Let child hold piece of iron and wood of same size. (*b*) Drop each into water.	Iron harder to hold up than wood. Iron sinks; wood floats.	*Iron is heavy.*
2. (*a*) Let child scratch wood with iron nail. (*b*) Drive nail into piece of wood; pull nail out and examine.	Wood easily scratched. Nail not altered, but hole has been made in wood.	*Iron is hard.*
3. Rest iron and glass rods on two supports; hang heavy weights on parts of rod between the two supports.	Glass rod breaks; iron rod does not break.	*Iron is strong.*
4. (*a*) Get child to try to bend iron and lead tubing. (*b*) Put poker in fire till end is red-hot; press hot poker sideways on hearth.	Lead tubing bends; iron tubing does not bend. Poker easily bent.	*Iron does not bend when cold, but bends when hot.*
5. (*a*) Get child to strike piece of iron wire with hammer. (*b*) Make wire red-hot; strike it with hammer. (*c*) Show specimens of sheet-iron and iron wire.	No effect is produced on iron. The iron wire is flattened.	*Iron can be hammered out when hot, but not when cold.* *It can also be made into wire.*
6. Melt lead in iron spoon.	Lead melts; spoon does not.	*Iron does not melt easily.*
7. Show piece of iron that has been exposed to air for a long time.	Iron is covered with brown scales.	*Air rusts iron.*
8. (*a*) Try to pick up nail, penny, shilling, lead, etc., with a magnet. (*b*) Separate iron filings from sand by means of a magnet.	Magnet only picks up the iron.	*Iron is the only common thing the magnet will pick up.*

CHAPTER XII.

INVESTIGATION—HEURISM.

Men must, as far as possible, be taught to become wise by studying the heavens, the earth, oaks, and beeches, but not by studying books; that is to say, they must learn to know and investigate the things themselves, and not the observations that other people made about the things. We shall thus tread in the footsteps of the wise men of old, if each of us obtain his knowledge from the originals, from things themselves, and from no other source.—(Comenius, *The Great Didactic*, p. 150.)

WHEN we want to know a thing, there are two courses open to us. We may either inquire from some authority or book, or we may try to find out for ourselves. We may want to know

1. A simple fact, or group of facts, as, for example, What a person's name is, What Cairo is like, What the average temperature of Sheffield in January is, What the specific heat of copper is, etc.;

or we may wish to know

2. The *why* of a thing: for example, Why carts have wheels, Why we use oil in machinery, Why some summers are dry and warm, while others are cold and wet.

In these cases we are searching for some universal principle to explain things for us. We may, however, want

3. Examples and applications of some general principle we have already come across. Thus, we know that all gases expand when heated, and we search for illustrations of this principle in everyday life; such illustrations would include the ventilating effect of a fire, the effects of warming a toy balloon, the production of land and sea breezes, etc.

It is obvious that, in some of these cases, finding out for ourselves is impossible; thus, no one has yet discovered why some summers are warm while others are comparatively cold. In other cases, "finding out" would be highly inconvenient: we should not care, for example, to be compelled to determine the specific heat of every substance about which we wanted such information, and we should have to wait half a life-time before we could satisfactorily say what the average January temperature of Sheffield is. In all cases, first-hand investigation is the most troublesome method of gaining information; it is much easier to be told things, and we may not unreasonably raise the question: is it ever worth while? Clearly there are two things to be considered:—

1. Whether it is facts, as facts, that we want to accumulate, in which case memory is all-important.

2. Whether our power of "making knowledge" through our own experiences is equal to the occasion. We all possess the power in some degree, unless disuse has led to atrophy.

Let us compare the two extreme positions. Dickens's Mr. Gradgrind believed in facts :—

> Now, what I want is facts. Teach these boys and girls nothing but facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon facts; nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to facts, sir!

And Mr. Choakumchild, the schoolmaster, had himself been brought up on facts.

> He, and some one hundred and forty other schoolmasters, had been lately turned at the same time, in the same factory, on the same principles, like so many pianoforte legs. He had been put through an immense variety of paces, and had answered volumes of head-breaking questions. Orthography, etymology, syntax, and prosody, biography, astronomy, geography, and general cosmography, the sciences of compound proportion, algebra, land-surveying and levelling, vocal music, and drawing from models, were all at the ends of his ten chilled fingers. . . . He had taken the bloom off the higher branches of mathematics and physical science, French, German, Latin, and Greek. He knew all the water-sheds of all the world (whatever they are), and all the histories of all the people, and all the names of all the rivers and mountains, and all the productions, manners, and customs of all the countries, and all their boundaries and bearings on the two-and-thirty points of the compass. Ah, rather overdone, Mr. Choakumchild.

If he had only learnt a little less, how infinitely better he might have taught much more![1]

Compare this with Rousseau's injunction:—

Make your pupil attentive to natural phenomena and you will soon make him curious; but, in order to nourish his curiosity never be in haste to satisfy it. Ask questions that are within his comprehension, and leave him to resolve them. *Let him know nothing because you have told him, but because he has comprehended it himself: he is not to learn science, but to discover it.*[2]

We may disagree with Mr. Gradgrind's view that a child grows by merely being told things without going to Rousseau's opposite extreme. To demand that a child shall find out everything for himself is asking the impossible. Children are naturally curious, but, strong as the instinct is, it is only kept up by being satisfied. To set a child to solve his own problems is, in many cases, simply to balk his curiosity, and by so doing we diminish its force. But Rousseau is only insisting upon the recognition of what Pestalozzi called the child's "sacred right of discovery". Nor did he mean to limit that right to things that belong to the world of nature, although in this passage he is talking of science. The advantage of the process of finding out lies in the feeling of independence and self-reliance which it gives; and it does happen at times that we must either find out for ourselves or remain ignorant. And still more frequently we must leave ourselves in

[1] Dickens, *Hard Times*. [2] *Emile* (Payne's translation), p. 137.

the hands of ignorant or incompetent people, unless we are prepared for independent inquiry. It may be election time, and we feel dissatisfied with the case as set out by party politicians on such matters as Unemployment, Temperance, Free Trade and Protection, or the Navy. Being persons of independent minds, we investigate the questions for ourselves. Similarly, a good teacher is always actively investigating various methods of solving the difficulties that present themselves, and so on. It is this critical, investigational attitude of mind we wish to see in our pupils after they leave school. Accordingly, we do not rely solely upon exposition. We often set them to pursue little investigations for themselves. We do not tell our children that $2 + 4 = 3 + 3$, or that $3 \times 4 = 12$. We make them find these things out. The method of teaching which is based on this investigational attitude of mind has been called Heurism. It covers the procedure which places "pupils, as far as possible, in the attitude of the discoverer—methods which involve their finding out, instead of being merely told about things". The idea is not, of course, new, as we have already seen, but it has been forcibly re-stated in recent years. Moreover, investigation follows no one method. There are many methods all of which may be investigational, and the choice will be determined by the circumstances of the particular case.

The question naturally arises, can children really investigate things for themselves? At any rate Froebel thought they could :—

It is, of course, easier for him to hear the answer from another . . than it is to seek and discover it himself. To have found one-fourth of the answer by his own effort is of more value and importance to the child than it is to half-hear and half-understand it in the words of another; for this causes mental indolence. Do not, therefore, always answer your children's questions at once and directly; but *as soon* as they have gathered sufficient strength and experience, furnish them with the means to find the answers in the sphere of their own knowledge.[1]

Rousseau and his English disciples—e.g. the Edgeworths—thought so too. This is how their ideal nine-year-old English boy behaves:—

He finds a kind of rainbow on the floor. He calls his sister to see, and wonders how it came there. The sun shines brightly through the window. The boy moves several things about upon which the light falls, saying "This is not it. Nor this." At last, when he moves a tumbler of water, the rainbow vanishes. There are some violets in the tumbler, which he thinks may explain the colours on the floor, but, when the violets are removed, the colours remain. Then he thinks it may be the water. He empties the glass, the colours remain, but they are fainter. This leads him to suppose that the water and the glass together make the rainbow. "But," he adds, "there is no glass in the sky, yet there is a rainbow, so that I think the water alone would do, if we could hold it together without the glass." He then pours the water slowly out of the tumbler into a basin, which he places in the sunlight and sees the

[1] Froebel, *Education of Man* (Hailman's translation), p. 86.

colours on the floor, twinkling behind the water as it falls.[1]

We may not find many boys like this, but, under the stimulus of curiosity or of necessity, they do carry on inquiries of their own, and devise experiments long before they have any training in scientific method. An extreme Heurist would carry out this principle to the bitter end, and so make Heurism *the only method* by which children can be educated.

Is instruction in science to be given in schools for the purpose of information in these subjects, or for the purpose of mental training ?—a perfectly plain issue, utility or education, an issue on which there can be no compromise. A syllabus of work excellent from one point of view is quite useless from the other. If the intelligence is to be developed by this means, if the child is to find out things for himself, if he is to perform experiments, address his own questions to nature, make his own observations, and draw his own conclusions, and simply have the proper conditions supplied by, and receive suitable information and guidance where necessary from his teacher, the amount of marketable information which he will acquire, as tested by ordinary methods, in a session will be about the same as his teacher might have imparted to him as information in two or three lectures.[2]

[1] Edgeworth's *Practical Education*, Vol. I. pp. 84-5. (Passage quoted by Dr. Kimmins in his address on "Science Teaching in Schools," in *Education in the Nineteenth Century*, p. 134. Cambridge University Press.) Miss Edgeworth's educational story *Harry and Lucy* is a classical example of Heurism as a method in teaching.

[2] Dr. Kimmins, "Science Teaching in Schools," in *Education in the Nineteenth Century*.

Without admitting for a moment the high claims which are made by the leading advocates of investigational methods, it is important that we should understand the idea and see how far it is practicable.

The student must remember that Heurism does not imply some magical method of transforming children into ready-made philosophers, and removing for ever from the teacher's shoulders the burden of teaching Nor must he expect to see new apparatus, and, above all, he must not think that Heurism is equivalent to "playing at learning". It is neither more nor less than *an attempt to train children to think and investigate for themselves*, to get them to take a hand in "making knowledge," to understand by actual experience how conjecture—mere opinion—can be tested and either thrown aside or transformed into belief justified by inquiry, and if any transformation is effected in the schoolroom at all, it is in the *spirit* in which the work is done. The classroom is not intended to be merely a listening-room, but a *work-room, a laboratory*. And be it noted that the laboratory, without the *spirit* of real investigation, is at least as deadening as the lecture-room, if not more so.

We have often to make a choice between telling things to our children, or setting them to find out for themselves. It goes without saying that the choice of the latter method will be determined by—

(1) Its possibility from the point of view of the children.
(2) The amount of time available.
(3) The resources of the school.

Thus, in geography shall the teacher tell the children the length, breadth, and area of England, or shall he set them to find out? In this case, the problem for the children is clear enough. It is all a question of whether or not the teacher has the means at hand for the purpose — atlases, rulers, squared tracing paper, etc. The advantage of an investigational method in such a case, as compared with merely telling, lies in the enormous power the pupils gain. But let us always remember that once the pupil has grasped the method in this and similar cases, and can use it with tolerable accuracy, it is waste of time to insist on this investigational method being used in every new case. Too much problem work, compelling the use of apparatus for the sake of using it, in a mistaken idea that it is "the correct thing," can be as soul-destroying as Mr. Gradgrind's *fact* method.

There is no part of the school work into which the method of finding out cannot be profitably employed. And, though an investigational (scientific) method tends to be more closely related in popular opinion to mathematics and science, it has an equally large place in the teaching of the literary subjects, simply because it is impossible to teach adequately without it. Thus, in literature and history we ask older children to compare two versions of the same story, different treatments of the same theme. We ask them to draw a plan of a battle-field from the accounts of eye-witnesses, when, it may be, the accounts do not

absolutely agree.[1] Grammatical constructions, the use of punctuation, etc., are all taught with the help of investigational (problem) work.

In work of this kind it is essential that the pupils should clearly understand the problem that awaits solution, and, for this reason, the problems should, as a rule, be such as arise naturally during the ordinary process of teaching. There must always be a felt need. All that has been said in the chapter on Observation applies here, for we are simply extending the method so as to cover a wider field. The need having been aroused, and the children being able to see the end in view, it is often necessary to discuss the conditions of solution with the class, and to guide them in the choice of means. The skill of the teacher will lie in his successfully subordinating his apparent share of the work. He must decide for himself how far the pupils may be allowed to go astray. The greater the variety in the methods of attack which the pupils adopt the better. The natural impatience of children to achieve results will often make them chafe under the teacher's insistence upon rigid care and accuracy. He will need, therefore, to be constantly stimulating and encouraging, as well as critical. The pupils must be convinced by the enthusiasm of the teacher of the importance of the end to be achieved.

As an illustration of the best sort of investigational method in science teaching for boys of fourteen years of

[1] Compare the excellent suggestions for problem work in history in Mr. Keatinge's *Studies in the Teaching of History*.

age, we quote from Wilson and Headley's *Elementary Chemistry*, Part I, a really excellent book which the student would do well to study. The method is roughly as follows. Preliminary questions are set which can be answered from general knowledge. "In this way a pupil begins by thinking out what he already knows about the subject, and reduces his ideas (correct or otherwise) to writing; the necessity for experiment is thus often made evident." Then follow full and plain *directions* for experiments and observations, and, after the practical work, a list of questions is given to draw forth the boys' *conclusions*.

PRELIMINARY QUESTIONS ON HEAT.

1. A piece of metal and a piece of wood are lying together in the same room; which would feel coldest to the hand? Is one really colder than the other? Give reasons for your answer.

2. Why are two pieces of ivory often inserted between a teapot and its handle?

3. Explain how it is that a wire screen placed before a fire causes the heat to feel less intense to the hand.

4. Does heat alter the size of bodies? Give examples drawn from your own experience of its effect (if any) on a solid, a liquid, and a gas.

5. Why do thick vessels crack more easily than thin ones when they are suddenly heated?

6. When heat is applied to a large piece of melting ice, does the ice get hot? Why does it take so long to melt?

7. Do you think that boiling water gets hotter the longer it is heated? Give reasons for your answer, and state what becomes of the water.

8. Do other liquids, such as methylated spirit and turpentine, become as hot when they boil as boiling water?

9. Do all solids require to be heated to the same degree before they melt? Illustrate your answer by several examples.

10. Name and describe the instrument commonly used for testing the hotness or coldness of things.

Experiment 1. On the Conducting Power of Solids for Heat.

Required: Rods of glass, copper, and iron of equal length and thickness, wire gauze.

Directions.

A. Hold the ends of a glass and of a copper rod—one in each hand—and place the other ends close together in a Bunsen flame.

Note which feels hottest after a short time. Cool the copper rod, and try the experiment again, using copper and iron.

Note which of the two seems to conduct heat best.

B. Hold a flat piece of wire gauze with tongs, and lower it gradually over a Bunsen flame.

Note the affect when the gauze is about half-way between the original top of the flame and the top of the burner. Lower the gauze right down to the burner and observe the result.

C. Turn off the gas, and place the gauze about two inches above the burner. Turn on the gas, and bring a lighted taper down on the *top* of the gauze.

Note the position of the flame. Withdraw the gauze sideways and observe the result.

LABORATORY NOTES.

Observations in A, B, and C.

(i) Which of the three substances conducts heat best, and which worst?

(ii) Explain the effect observed in B and C.

(iii) Why is wire gauze placed under glass vessels before heating them?

EXPERIMENT 2. TO FIND WHETHER THE VOLUME OF WATER ALTERS ON HEATING.

EXPERIMENT 3. EXAMINATION OF A THERMOMETER.

EXPERIMENT 4. TO LEARN HOW A THERMOMETER IS GRADUATED.

Information on other methods of graduating thermometers, latent heat, and experiments, etc.

It may be objected that opportunities for such systematic work increase with the age of the pupils, and, *per contra*, are increasingly difficult to devise the younger the children are with whom we are dealing. This is perfectly true. The failure to recognize frankly the situation only results in make-believe, and tends to breed in children intellectual conceit. It is a mistake to think children of twelve years old can *investigate* problems so difficult as why it is warmer under a glass bell-jar placed in the garden than under a box. We can demonstrate that it is warmer, or lead children to find out the fact for themselves, if their previous experience of glass garden frames has not already taught them. But to expect children without scientific know-

ledge to suggest that glass is penetrable by direct heat rays, and, at the same time, is a non-conductor, is an altogether different matter. It is equally mistaken to think the *children* are investigating when we repeat Muschenbroeck's experiment to show that plants transpire, covering the soil with some waterproof material, and inverting a bell-jar over the plant. This is teaching by demonstration, admirable and proper, but there is nothing investigational about the procedure.

In an earlier chapter it has been shown that many so-called *observation lessons* are nothing but *description* helped out by illustration. True observational work is essentially heuristic, but it is clear that the investigations which small children can make are limited in their range. Nevertheless the teacher may devise many little problems in every subject he is dealing with, making the children feel themselves in the presence of difficulties they would like to solve, giving them some sense of how knowledge is arrived at, and training them to understand the difference between *knowledge* and *conjecture.*

A few words are necessary on the use of apparatus and experiments in elementary science lessons as illustrative devices. It should be clear from what has been already said in connexion with observation and heurism, that all nature study and elementary science work must start from the experiences the pupils already have. This knowledge is extended in two ways:—

1. By first-hand investigation.
2. By the teacher supplying information.

In the latter case, illustrations will be necessary.[1] The teacher will use the homeliest possible materials and take results at their face value. Thus it is unwise in dealing with mechanical forces to confine ourselves to toy apparatus because it gives more or less theoretical results, owing to friction being reduced to a minimum. We can test working efficiency by means of our toy pulleys, but our great concern should be to show to what extent in practice friction interferes. We must, therefore, also use actual pulleys. In primary schools the teacher is often compelled to demonstrate much that the pupils might very well do for themselves. There is no great harm in this if the procedure is designed to show the pupils how knowledge is arrived at, rather than to exhibit a series of impressive tricks.

EXERCISES.

1. How would you teach a class of ten-year-old children to find out the principle of the mariner's compass? Compare your procedure with that you would adopt in demonstration, as to time required, cost of apparatus used, trouble to yourself, and its effect upon the children.

2. Consider the following topics in respect of

(*a*) Their suitability for school work.

(*b*) The possibility of treating them on the investigational method.

[1] *Cf.* Chapter on "Illustration".

(*c*) The age at which they would be possible.

(i) The form of the sonnet.
(ii) Specific gravity.
(iii) The conditions affecting climate.
(iv) The structure of the eye.
(v) The properties of a triangle.
(vi) How it is that flies can walk on the ceiling.
(vii) The use of the full stop.
(viii) Cromwell in Ireland.

3. Give each member of a class of twelve-year-old boys (who know nothing about floral structure) a wallflower. Ask them to take it to pieces, and to describe in writing its structure. Give them no help. Read their work, and estimate how much they have found out for themselves.

4. Distribute amongst a class of boys a number of cardboard triangles, so that each boy has three of different shapes. Assuming they know what right angles, acute angles, and obtuse angles are, and that they can use a protractor, ask them to examine the triangles to find out all they can about the angles. See how many will *discover* that the three angles of each triangle are equal to two right angles. How would you *lead* them to discover the fact? What merit would attach to the discovery? Would it have been better to tell them? If not, why not?

5. Consider the example quoted on pp. 160-161 from Wilson and Headley's "Chemistry". In such a lesson, whose thought is dominant—the teacher's or the pupils'? At what point (if any) can the pupils escape from the intellectual strait-jacket prepared for them? This criticism exhibits at once the strength and the weakness of heurism—why?

6. Would you allow your pupils *to find out* the value of speaking the truth, of brushing their teeth, of being punctual,

of being considerate for others? If not, what other procedure would you adopt? Why?

7. Consider how far the principles of heurism could be applied to the teaching of literature. How would you lead adolescents to discover for themselves the beauties of Wordsworth? If they do not discover such things, can you *teach* them? How does such a problem differ from the problem set in the first question?

8. Ask a class of thirteen-year-old boys to study carefully the extracts printed below. With a view to finding out all they can about the state of the Navy in Charles II's reign, let them make a list of the facts they find in them or deduce from them, and also a list of questions which the extracts raise in their minds but do not solve. On the basis of these questions, draw up a scheme for a lesson to the same boys on James II and the Navy.

THE NAVY, 1660-1688.

I.

There is no man of common sense in our island who does not, or ought not, to know that England can never be at ease, without she be master of the seas, at least to such a degree as that no prince or state might alone dispute the superiority with her.—(James, Duke of York, 1676.)

II.

When the Dutch came up the Medway, the English tongue could be heard on board their ships.—(Pepys.)

III.

Merchants saved themselves in the uncertainty of their payments by the greatness of their prices.—(Pepys.)

IV.

Englishmen, and more especially seamen, love their bellies above everything else, and therefore it must always be remembered, in the management and victualling of the navy, that to make any abatement from them in the quantity or agreeableness of the victuals is to discourage and provoke them in the tenderest point, and will sooner render them disgusted with the King's service than any one other hardship that can be put upon them.—(Pepys.)

V.

The captains waste time in the ports which ought to be spent at sea, they so fill the ships with merchandise "that they have no room to throw aside their chests and other cumbersome things upon occasion of fight, whereby the gun-decks are so encumbered that they cannot possibly make so good an opposition to an enemy as otherwise they might".—(Pepys.)

VI.

No king ever did so unaccountable a thing to oblige his people by, as to dissolve a Commission of the Admiralty then under his own control, who best understands the business of the sea of any prince the world ever had, and things never better done, and put it into hands which he knew were wholly ignorant thereof, sporting himself with their ignorance.—(Pepys, 1679.)

VII.

The greatest part nevertheless of these Thirty Ships were let to sink into such distress through Decays contracted in them; their planks some of them started from their Transums, Tree-nails burnt and rotted, and Planks thereby become

ready to drop into the Water, as being in many places perished to powder . . . and their whole sides more disguised by shot-boards nail'd and Plaisters of Canvas pitch'd thereon for keeping them above water than has been usually seen upon the coming of a fleet after a battle. . . . I have with my own hands gathered toadstools growing in the most considerable of them as big as my fists.—(Pepys, 1688.)

VIII.

Not a penny left unpaid to any officer, seaman, or workman, artificer, or merchant, for any service done in, or commodity delivered to the use of the Navy.—(Pepys, 1688.)

CHAPTER XIII.

QUESTIONING.

Do angels wear white dresses, say?
  Always or only in the summer? Do
Their birthdays have to come like mine, in May?
  Do they have scarlet sashes then, or blue?
. . . . . .
How old is God? Has He grey hair?
  Can He see you? Where did He have to stay
Before—you know—He had made—Anywhere?
  Who does He pray to—when He has to pray?

How many drops are in the sea?
  How many stars? Well, then, you ought to know.
How many flowers are on an apple tree?
  How does the wind look when it doesn't blow?

Where does the rainbow end? And why
  Did—Captain Kidd—bury the gold there? When
Will this world burn? And will the firemen try
  To put the fire out with the engines then?

—(S. M. B. Piatt.)

IN ordinary life, when we ask a question we are endeavouring to solve some difficulty or to obtain a particular piece of information, and we address our ques-

tion to persons from whom we hope to get a satisfactory answer. Children at home are constantly asking questions of this kind of their elders, and intelligent parents encourage them in the practice. It is often a sign of mental alertness, a condition of mind particularly favourable to successful instruction. For this reason we should expect to find children at school in the habit of asking questions of their teacher. Unfortunately, the school atmosphere is not always friendly enough for this to happen. When this is the case, the teacher should make it his first object to establish such relations between himself and his class as will make questions of the kind a feature of classroom work, though, of course, the freedom which this would give to the children must not degenerate into licence. If a teacher is not strong enough to prevent his pupils misusing freedom of the kind, it is better that he should forbid it altogether. Although rigidity of discipline is not by any means a sign of a strong teacher, a beginner cannot usually afford to give as much freedom as his more experienced colleague; but he must be on the watch lest firmness should degenerate into a habit of frigid hardness.

Besides the danger to discipline which prevents many teachers from encouraging the questioning habit in their class, there are one or two other things in this connexion which demand watchfulness on the teacher's part. Children sometimes ask frivolous questions; this may happen without any thought of giving annoyance to the teacher. They are questions which

a moment's thought would make unnecessary, and children must be taught to think first and ask afterwards. Gentle but firm repression is often necessary at home, and in school it is even more important. We have to distinguish between loquacity and thoughtfulness. Again, the course of the lesson may be seriously disturbed by a question which is good enough in itself, though it cannot be answered conveniently at the moment. It is easy to be led into side issues unless the general plan of the lesson is clearly kept in mind. Some questions are best treated by being postponed; they may set up a problem which the class can be invited to answer next time, looking round and about in the meantime. The last thing to notice is that, in the multitude of questions a teacher may receive, many problems will be set him which he cannot solve. In such cases it is best frankly to confess ignorance, though we may combine with our confession a promise to look up the matter for a future occasion when that is possible and reasonable. Children do not lose confidence in the teacher who is clear when he does not know.

The tradition of the schools is that questioning belongs in the main to the teacher, and he rightly looks upon questioning as a most important teaching instrument. His questions serve various ends. The teacher may wish to see how far his boys have followed his exposition, and whether they are in a position to repeat it, or he may wish to strengthen his pupils' hold upon facts which are frequently wanted in their work—so

much so that progress depends upon their being automatically ready for service at any time (the multiplication and other tables in arithmetic, and various formulæ in mathematics); to some extent the same necessity arises in many other school studies—dates in history, fundamental facts in geography, generalizations (with typical examples) in science and language, spelling, vocabularies, etc. In all these cases the form of question is simple and direct. The object is repetition merely, as it is only by repetition that we can expect to fix those fundamentals which are the operating tools of future work, and must therefore always be at the pupils' command.

Répétez sans cesse is an old direction, which applies to cases of the kind. Work of this sort is more or less mechanical in nature, but it is of the utmost importance. A certain amount of *drill*, far more perhaps than is common in these days, is imperative if sure foundations for higher work are to be laid. At the same time drill need not be monotonous. It should always be rapid, and its form should be as varied as the subject-matter allows. Children enjoy the stimulus of rapid work, though here, again, the limit of rapidity is reached when it leads to inaccuracy.

Other forms of revision are also necessary, particularly with older children. The pupil must be able (*a*) to put what he knows to new uses; (*b*) to combine what he has learned in one lesson with what he has learned in another; (*c*) to re-state what the teacher has told him, or what he has read, from a different standpoint.

These are typical of what is commonly called *problem work* in the various subjects of the school course. They demand considerable power on the part of the children, and will hardly be given until many examples have been worked out orally by the teacher and the class together. For example, suppose we are revising with Standard VI or VII the geography of Britain. Instead of covering the old ground in the old order, we may approach it through a series of problems for class discussion. Why is Liverpool a greater port than Bristol, Cardiff than Milford, Newcastle-on-Tyne than Middlesborough? Consider the relative advantages of the various routes of getting from Birmingham to Ireland. Make a convenient itinerary for an American tourist who is interested in English history and is on a visit to this country. How was it that Wales could resist the advance of the English so long? Assuming that we have some time at our disposal, consider from the standpoint of the comparative pleasure to be got out of a railway journey from London to Edinburgh, which of the various possible routes is preferable. We may cite also such problems as the study of a population map of England as a means of revising industries; the consideration of a tourist ticket list issued by any railway company, and so on.

It is not suggested that these are problems such as boys of Standard VI can solve unaided. They serve, however, to guide inquiry and for the collection of data under the general supervision of the teacher; they give a point of view which throws new light upon geographi-

cal facts and relations. Such problems are essentially human, and for that reason they make a special appeal to the class. At the same time, they can only be solved when there is a *feeling* for the subject which is the result either of travel and experience, or of many descriptive lessons in previous years. The study of a tourist list would be illuminating only if the pupils have travelled the country over in picture and story with a previous teacher, so that, when a boy finds that Ilkley is amongst the Pennines, map and memory come to his aid, and he can weigh up the pleasures of a holiday there.

The lower down in the school we go, the less must we expect to find the power of dealing with the material of knowledge in any large constructive way. Problem work, in other words, becomes more and more difficult to invent, except perhaps in the field of story as already suggested in the chapter on Narration.

In addition to these various forms of revision question, it is often useful to cross-question a class on other occasions.

(1) The teacher frequently needs to find out what his boys know about a subject before he begins his own lesson upon it. Or (2) he may know that they have sufficient practical acquaintance with certain facts to enable them to see the inner significance—the underlying principles—if only they have grasped the real nature of the facts. Or, again, (3) he may wish to show the children that what they think they know is based on superficial observation and consequent misunder-

standing, and to bring this out he may seek to involve them in some contradiction. In all these cases the teacher resorts to questioning as the best means of attaining his object. This type of questioning is called *analytic*, because the children are led to examine their own experience and knowledge critically and to rearrange it from a special point of view; the teacher himself adds little or nothing until he has led his class to sift their own contributions to the subject. In the first case, the result of his questioning will show the teacher what ground he has to build upon in giving his own lesson, and will leave the class in a state of expectancy which will be favourable to the reception of what the teacher has to tell. In the second case, the children may, for example, be led to a fuller understanding of various and hitherto isolated facts by being led to see, e.g., their inter-relation, when they are considering why Liverpool is such a great city; or, the practical experiences of the children may be brought into relation to some principle already known to them, e.g. when they are considering why carts have wheels; or, again, the questions may lead to, or prepare the way for, a generalization, e.g. that the rate of cooling of different bodies is a definite property of the bodies themselves. In examples of this sort questioning is imperative. The saying *To tell is not to teach* is particularly true here. In case (3) the pupils through being involved in a contradiction will be made conscious of error, and ready, therefore, for correction.

EXERCISES.

1. Are children's questions always to be answered? Consider the following cases:—

(*a*) Mother: Tommy, stop making that noise. Child: Why?

(*b*) Child (disappointed at not being able to go out): Mother, why does it always rain?

(*c*) Child: Why do cats miaow, mother? Why must I wash my hands?

(*d*) In the course of a lesson on the physical geography of South Africa a boy asks: Please, sir, can the Boers fight better than the English?

2. A class of fourteen-year-old boys have read for the first time and privately, Kinglake's "Eothen" or Scott's "Marmion". Frame half-a-dozen questions which would bring out whether or not they had got a fair grip of the text as a whole. Now suggest six more which would necessitate their going back to the text and would occupy them profitably with it during a second reading.

3. Think out a practical plan of drilling a class rapidly in multiplication or other tables which you can work without using your voice.

4. "Honesty is the best policy." Frame a series of questions and probable answers designed to bring out the weakness of this maxim.

5. Take a Standard III (or a second form) in three or four different schools and find out in quarter of an hour all they can tell you about *motor-cars*. In at least one case give individual boys permission to tell you all they know without being questioned; in the other cases ask questions all through. Estimate (1) Which method brings most out of

the boys in the time. (2) Which method is the more useful as leading up to a lesson on the subject.

6. Critically examine the following transcript of a series of questions and answers as they actually occurred. Suggest any weaknesses you can, either in the validity of the thought or the order which was followed :—

A. INTRODUCTORY TO LESSON ON "SWITZERLAND AS THE PLAYGROUND OF EUROPE".

Have you boys ever seen a book like that before?

(Boys show hands.)

This sort of book is very well known all over Europe. What kind of a book is it?

A guide-book.

It is a guide-book. What sort of people use a book like that?

Tourists.

What are tourists?

People who tour about.

What do you mean by touring about?

Travelling about.

Commercial travellers are tourists then. What is a commercial traveller?

A man who takes orders.

Is he a tourist?

Yes.

He is a tourist you can say, but he is not generally called a tourist. I wonder why we do not generally call a commercial traveller a tourist?

He does not go for pleasure.

A tourist, then, is a man who travels for pleasure.

Do you boys have holidays?

Yes.

And what do you do in your holidays?

Play. Go walks. Go away to the seaside.

Why do you go away to the seaside?

For pleasure. For fresh air.

Is that really why you go to the seaside—for fresh air? How many of you like to go to the seaside?

(Boys show hands.)

And you like to go because the air is fresh? Really.

For enjoyment.

Which would you rather do—go to Stanage Pole or to the seaside? Who has been to Stanage Pole?[1] Who's been to Ringinglowe?[1] Now which would you rather do—go to Ringinglowe or to the seaside? Who would rather go to the seaside? Most of you.

Why?

Get more pleasure at the seaside than at Ringinglowe.

What sort of thing do you mean by pleasure? What can you do at the seaside that you cannot do at Ringinglowe?

Paddle.

But if there were a brook at Ringinglowe, would it be the same? You could paddle in a brook.

No.

Why not?

You can't see ships that you can at the seaside.

Would a boy who lives in Hull or Liverpool want to go to the seaside?

No.

Why doesn't he want to go to the seaside and see ships?

[1] Well-known heights in the near neighbourhood of Sheffield and on the edge of the moors.

Because he's lived there all his life.

What does he see every day?

Ships sailing to and fro.

Why would it not be the same thing for him to see ships as it would be for you?

Because he is used to seeing them.

Why is going to the seaside pleasanter than going to Ringinglowe?

You see more things.

But I have stood at Ringinglowe, and have looked over Sheffield, and seen church after church, building after building. You can see a lot at Ringinglowe.

It is a change at the seaside.

A change from what?

From your own town.

Then it is pleasanter to go to the seaside than to Ringinglowe because it is a change. Anything else?

You see things there you don't see in Sheffield.

Of course, the fresh air is there too; but I don't think you boys are quite thinking of fresh air when you go to the seaside. Why is paddling so pleasant when you go to the seaside?

Because it's so hot. Because the water is cool.

Now, which is it that's hot?

Ourselves that are hot.

What is cool, and why is that pleasant?

It is cooling.

Any other reason? I wonder if the boys who live at the seaside paddle as much as the boys who go for a holiday?

No.

Why not?

Because they're used to it.

Then, why do you like paddling?

It's a change.

It is something you cannot do everyday in Sheffield. We cannot see ships everyday in Sheffield, and we like to go to the seaside because we can see and do new things.

This book is about Switzerland, and people go to Switzerland from all over the world. I wonder why?

To see the mountains.

But why mountains?

To see the glaciers and snow on the top of the mountains.

But why the snow on the top of the mountains?

They want a change.

Why do they want a change?

They want a change of scenery. They cannot see mountains and glaciers in Sheffield.

If we could see mountains and glaciers in England, should we go to Switzerland?

No.

Then it is to see things that we cannot see everyday that we go to Switzerland for. Those wonderful mountains and glaciers and lakes—is there nothing at all like it in England?

In Wales.

Yes, that is something like it, but not altogether, for there are no glaciers in Wales.

In Scotland.

Are there any glaciers in Scotland?

No.

Anywhere nearer than Wales?

Cumberland.

What do we call the hills there?

The Cumbrian Hills.

And what do we call the country round about?

The Lake District.

Why do we call it the Lake District?

Because there are a few lakes there.

Well, now, we are going, as it were, to Switzerland for a holiday, to see and enjoy the lakes and mountains and glaciers.

The lesson proceeded—description helped out by pictures was the method adopted.

B. The subject was a circle and the object was to draw from the boys the essential property of the figure. Pointing to a circular piece of paper the teacher asked:—

What is that?

A circle.

(Holds a coin before the class.) And what is that?

A coin. A circle.

Also a circle?

(Describes a circle on the blackboard.) What is that?

A circle.

Then, that and that and that are all circles—all alike—all the same thing?

No.

But they are all circles. If they are not all the same thing, why do you call them circles?

Not of the same substance.

What substance is that?

Paper.

And that?

Copper.

And that?

Chalk.

Then, that is the only difference between that and that and that—they are different substances?

They are different sizes.

So we may have big circles and little circles?

Yes.

Anything else? No other difference between them?

They are not the same area.

Then, what other difference is there between them?

They are not the same area, and are different sizes. They are different in value. One is a coin and the other a sheet of paper.

Very good. In spite of that, you know that they are all circles. Now tell me what a circle is.

A ring.

(Points to a finger-ring.) Is that a ring?

Yes.

(Points to coin.) Is that a ring?

Yes.

Suppose I sent you to a shop to buy a ring, and you brought the lid of a saucepan, should I say, well done, Tom! That is just what I wanted.

No.

Why?

Because the lid of a saucepan is not a ring.

Would you bring a piece of paper?

No.

(Points to circle on blackboard.) Is that a ring?

No.

Why not? Why are these not rings?

They are rings.

Then you would feel quite justified in bringing that back if I sent you to buy me a ring, and feel that you had done

the right thing. How many think that the circle on the blackboard is a ring?

Only one! Only one thinks it is a ring. Those who do not think it is a ring should be able to tell me why it is not a ring.

What is there common—alike between this finger-ring and this on the blackboard?

Both are round.

Yet this is a ring and that is not. What is the difference?

One is open in the middle and the other is not.

What is there common between that (the finger-ring) and that (the piece of paper)?

Both round.

What is the difference?

One has a hole in the middle and the other hasn't.

Is that a circle—by the by?

Yes.

We have got a circle there—a circle there—and a circle there. This is a ring—these are not rings. What is there alike about all four rings?—that and that and that and that.

They're round.

Then is a circle anything that's round?

Yes.

That globe is round. Is that a circle?

Yes.

He says Yes. A football is a circle?

Yes.

How many think that is so?

Two or three not quite sure. The rest of you think it is not a circle. Is it round?

Yes.

It is round, yet not a circle. Yet all circles are round. Why is that not a circle?

A circle has not got any width and that has.

What is the width of that halfpenny?

An inch.

An inch wide, is it not? If I put twelve halfpennies side by side, how long would that be?

Twelve inches.

How wide is that (circle of paper)?

Eight inches.

Yes, that's about it—seven or eight inches—we will say eight inches.

Both these circles, then, have width. Why then is that not a circle (the globe)?

You can draw a line round anywhere and it comes to a ring, and you cannot on that piece of paper.

Well! (draws line round the paper disc—across one surface and over the other surface).

But that is straight.

Cannot I draw circles here (on the surface of the paper) with a pair of compasses?

Yes, but you cannot take them the other way

That is quite true. I could not take my pencil round that way and make a circle as I could about that globe.

But now compare the globe and the circle on the blackboard.

What difference in shape do you notice?

The sphere is like a ball—like an orange. It is solid.

What do you mean by solid?

That it has got length, and breadth, and thickness.

If a thing has length, and breadth, and thickness it is a solid. Is a halfpenny a solid?

Yes.

The edge of that paper—just the very edge of it—would that be a solid?

It has to have length.

Would the length of that edge of paper be a solid—would it have breadth—the edge of that paper?

Yes.

It has breadth, would it have thickness? Could it have both breadth and thickness—the very edge?

No, it would not have both.

If I cut a piece—ever so thin—along just the very edge of a halfpenny—the outside of it—here—would that have thickness? Is the outside of a halfpenny thick? Has it got thickness—the outside of it?

Yes.

The outside of a football—has that got thickness? The outside of it?

Yes.

You have told me that that is a circle, and this globe is not a circle. A circle has not got length, and breadth, and thickness; it is something that is round but is not a solid. What do you mean by round? Is an egg a round thing?

No.

Why is not the egg round?

It is longer than it is broad.

Is that penny longer than it is broad?

No.

Then what do you mean by round?

As long as it is broad. The length and breadth are both equal.

Which is the length of that circle? Would that line be the length, for example?

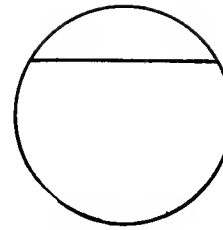


FIG. 10.

No.

How am I to find the length of a circle?

Draw it straight through the middle.

Suppose that is the middle. Is that the length? I have drawn it through the middle of that circle, is that the length from there to there?

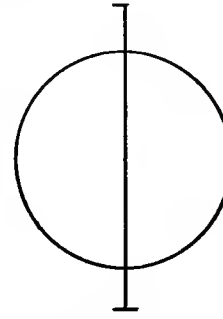


FIG. 11.

No. From the top edge to the bottom edge.

Then is that the width?

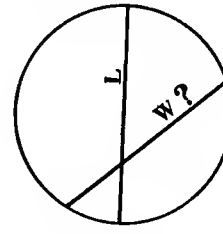
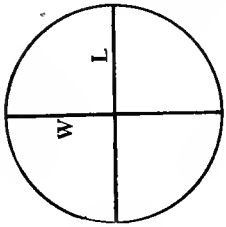


FIG. 12.

No. The angle must be at 90 degrees.



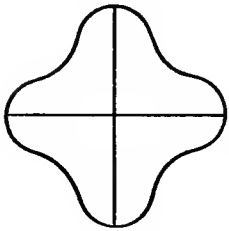
That is the width, then?

FIG. 13.

Yes; and those two lines must be equal, and if they are equal it is a circle.

That is so.

Yes.



Is the length equal to the breadth in this new figure?

FIG. 14.

Yes.

Is it a circle?

No.

Why not?

If you draw another straight line it will not be of the same length. The circumference is the same width round it.

What do you mean?

Draw other lines through the middle to the edge of the circle, they will be the same size as the others.

Certain lines that I have drawn in that circle you say are of the same length. What are those lines?

Equilateral lines.

What do you mean?

They are the same length from the middle.

We know that they are the same length from the middle and all go through one point. What is that point?

The centre.

They go through the centre—the lines go through the centre, and where do they stop?

The edge.

They go through the centre and stop at the edge of the circle. What do we know about those lines?

They are all the same length.

In any circle the lines that go through the centre of the circle and stop at the edge are equal?

Yes.

What is the shape of this (ellipse)?

Oval.

I draw lines through the centre, and stop at the edge, are those of the same length?

No.

Would that figure be a circle?

No.

CHAPTER XIV.

QUESTIONS AND CORRECTIONS.

THE art of skilful questioning can only be acquired by experience. The beginner is awkward because of the novelty of the situation in which he finds himself, and so long as this feeling of strangeness lasts he will not be in close enough touch with the minds of the children to question them effectively. At this stage the beginner will be wise to think out the line of attack he proposes to follow with his questions, and to rehearse it in the privacy of his own room. The actual lesson will probably not take the course he expects, but the rehearsal will give confidence and, moreover, will bring to light difficulties in the treatment of the subject which he can settle then and there. He must also remember that children readily pick up words and phrases which may stand for something in their minds quite different from what they do in his. It is fatal, therefore, to be satisfied with the mere reproduction of his lesson in the same order and from the same point of view as he has given it. He must get into direct touch with the children's minds; his

questions are a most important means of doing this, if only he will not be deceived by their readiness to reproduce his own words.

If, for example, we have been giving a lesson on the causes which affect rainfall, instead of beginning our revision by asking our class to enumerate the causes or to read them from their notebooks, we shall rather take a rainfall map of some new district and ask the class to consider it and suggest the reasons for the dryness here and the excessive moisture there. Or if our lesson has been an introduction to vulgar fractions, we shall not revise by asking formally for definitions and names like, What is a fraction? What do we call the upper figure? What does the line between the figures mean? We shall go straightway to the consideration of common denominators. In so doing revision will come naturally; time is saved by requiring the children to put to immediate use that which they have learned. If the occasion demands it, if, that is to say, events show that the class has not understood the first lesson, we may have to go back. It will be all the more effective now that the pupils have found their deficiency in actual experience.

All questioning is good which stimulates the intellectual activity of the class as a whole. The teacher will find himself tempted to lean on his clever boys, but that is a capital mistake. Discouraging as it is to go over ground again which the bulk of the class have not followed, it is often absolutely necessary. This repetition should follow a new course when

possible, and at times it will need to be plentifully sprinkled with questions.

In this regard, it is important to note that a lesson may be spoiled by too many questions. Questioning is a good servant, but a bad master. It is in itself a useful exercise for the class to follow uninterruptedly a piece of exposition, narration, or description. It is, moreover, impossible to produce broad effects such as we want in literature, or in certain history lessons, and, in fact, in every lesson in which part of our success depends upon touching the emotions of the children, if our statement is broken up at every point by interrogation. To stop in the middle of a poetical reading to ask the meaning of a word is destructive of the literary value of the lesson. In such cases we must trust to the context and the atmosphere we have produced to bring about the right total effect, even when the details are not all clear in the children's minds.

The abuse of questioning is one of the vices of the English elementary schools. Many teachers cannot tell their class anything without first asking a question. It comes from the idea that the children are kept mentally alert in this way, but an alertness which needs the constant stimulus of questions is not worth having. Indeed, the ordinary dialogue between teacher and class in these circumstances shows that it is the teacher who is thinking, not the children.[1]

[1] The student will find abundant examples of the sort of dialogue we have in mind in Stow's *Training System*, a book of great importance in the History of English Educational Practice, now out of print, but often to be purchased for a few pence in old book-shops.

A good teacher aims at training his pupils in independent *connected* thinking; and his revision questions may help or hinder this according as they call for free and continuous oral expression, or break up the material of the lesson into tiny snippets to be produced in turn at their call. With practice, even young children become remarkably expert in clear, continuous utterance. But, though continuous oral reproduction is better than the serial questions that carry the children from point to point through the lesson, the intellectual activity involved in mere reproduction is not serious enough to satisfy an able teacher. He asks questions which involve the reconstruction or rearrangement of the material of his lesson. Thus, he has told the story of the Norman Conquest from the ordinary English standpoint, and he asks a series of questions to bring out the story as William or some Norman knight might have told it.

Again, it is not uncommon for the questions a teacher sets to be more interesting than the answers they provoke. The teacher wishes to produce certain impressions vividly on the children's minds, and prepares material for their contemplation, under the guidance of carefully prepared questions, which will lead inevitably to the results he desires. This may be a useful method of teaching at times, but, be it noted, it is the teacher who is thinking—the children cannot refuse assent to his questions, or to draw the conclusions from the cleverly arranged material which he puts before them. When we are reading Plato's

dialogues, it is Socrates' questions that interest us, and not the answers of his pupils, who are often little more than lay figures. Similarly, it is the fundamental mistake of much of the so-called heuristic teaching to suppose that the children themselves are being trained to think by thinking; whereas it is the teacher's procedure which is the valuable part of the proceeding, in so far as it gives a model for the children's own thought when they are without his guidance.

For disciplinary reasons, it is well to avoid falling into the habit of repeating questions, and the young teacher will find it a useful exercise to forbid himself the luxury of changing the form of a question which happens to have been clumsily framed. This does not, of course, apply to the case in which a question calls forth no response from the class, and the teacher feels that this is because they do not know what he means.

There are, of course, other forms of questioning than the oral questions which we have chiefly been considering. The principle that questions should be in the main provocative of thought, should involve reconstruction and not mere reproduction, is true of written as of oral work, perhaps even in a larger measure. But we must also frequently assign to written work the humbler rôle of drill. Certain habits of writing must be acquired and these can only come by practice. If it is a modern language we are teaching, there is real use in the mere writing out of grammatical forms

frequently enough to make it as impossible to write "*vous etes*" as it would be to write "*cole* black *heir*".

The amount and the nature of written exercises must be determined by the call they make upon the teacher for corrections. Mere drill work can, of course, be corrected by the boys themselves when the accurate form is made accessible, and whenever possible the class should be made responsible for correcting their own work. Active supervision will always be necessary to prevent carelessness which might easily lead to actual misrepresentation.

It is also important to consider carefully whether or not a proposed exercise is likely to be done with relatively few blunders. In a sense it is true that the teacher who gives exercises which involve a mass of corrections condemns himself. He needs to reconsider his procedure not merely from the point of view of lightening his own labours, but from the standpoint of the boys themselves who get nothing whatever out of an exercise which is so troublesome to correct. Zealous teachers often place unprofitable burdens upon themselves by want of thought in this matter. Two fundamental principles should govern their practice:—

1. Corrections, in the educational sense of that word, can only be made by those who committed the mistake, and then only when they are conscious of how and why they went wrong.

2. Written work which is full of mistakes points either to an improper or mistaken demand or to some more or less subtle form of bad discipline.

EXERCISES.

1. Consider the following notes of two lessons on "The Lady of Shalott" with especial regard to the questions suggested, where they occur and the purpose they serve. The notes in italics were made after the first lesson was given.

I.

(The purpose of the lesson was to show when *not* to ask questions, and how difficulties may be met beforehand by creating an atmosphere favourable to the sympathetic appreciation of the poem.

The class was new to the teacher—it was made up of boys of Standard IV from a school in a very poor town district.)

(1) *Preliminaries.*

Inquire what poetry the boys know by heart, in the hope that one or other piece will serve, either through its subject or its setting, as a starting-point for the new poem.

(*Amongst others, Wordsworth's "Daffodils" was offered, and a boy recited it rather woodenly. The teacher used the picture in this poem as an introduction to a short talk with the boys about the Rivelin Valley—a familiar holiday resort to the boys—the river and the fields and the woodlands.*)

(2) *Subject-matter and its Treatment.*

(*a*) If no suitable poem suggests itself, lead the class to build up in their mind's eye a country scene, with cornfields instead of houses, and a wide, slow-moving river flowing through them, with trees (willows) on either bank, and a large island at one point of its course. On the island is an ancient castle—it is called Shalott—and lower down the river, almost out of sight, is an old town, Camelot, in which the king lives.

Our poem is made up of four pictures which together tell the story of "The Lady of Shalott".

(*b*) Read picture number one straight through, asking the class to listen, as it were, with their eyes shut and to try to see things just as the poet describes them.

Ask the class to tell what they actually did see in the mind's eye.

(*They mentioned all the significant parts of the picture, in some cases adding details (horses, etc.) which the poet did not give, but half the class had not caught the significance of the last stanzas—that the lady had only been heard in the stillness of the early morning or late in the evening, and that nobody had seen her. These verses were therefore read again, without explanation, and the children caught the point.*)

(*c*) Now we are going inside that castle. Whom shall we find inside?

Read the second picture straight through. Ask the class to compare the first with the second picture, and to suggest fitting titles for each—as a painter would, if he had painted it.

(*The Magic Mirror was suggested for the second, but they were not so happy about the first. Many had not seen anything in the second, except the lady and the mirror—her occupation had not struck them. The stanza was re-read—the mirror, the web, and the curse were now grasped in their relation to each other.*)

II.

(1) *Preliminaries.*

(*a*) Ask the class to recall the previous pictures—the castle and its surroundings—the interior of the castle.

(If such titles have been arrived at in the previous lesson,

they will serve admirably to hold together the ground setting of the poem.)

(2) *Subject-matter and its Treatment.*

We return to the outside of the castle, and to the high road running through the fields—a busy city road. Why? Where are the people going to or returning from? What sort of people shall we see? Amongst them knights. Describe the appearance of the richer knights—their armour (*greaves* on their legs), their shields, and their devices, the jewellery on the horses' harness, etc.

(*b*) Read Picture III. "The curse has come upon me." What has the lady done? What can this curse mean to her? The next picture will tell us—a curse is a gloomy, dreadful thing, and the very weather is afflicted by it. What may we call this picture.

(*c*) Read Picture IV. What then has happened to the Lady of Shalott? How did it all come about? Tell me what she did after leaving the castle and what she looked like in the boat.

Can we have a title for this picture?

(*d*) Compare the four pictures, and write their titles on the blackboard. Read the poem through from beginning to end, with a slight pause at the end of each stanza.

2. Make a note of every question which you hear in the next lesson you observe. Calculate:—

(1) How many of them were unnecessary.

(2) How many could not, in the nature of the case, be answered by the children.

3. You have given one or more lessons on the Spanish Armada—suggest three or four questions to answer which would involve a satisfactory review of the subject from a new point of view.

4. What is the value of dictation as a school exercise? What various methods of correction have you seen? Estimate their value from the standpoint (*a*) of their effect upon the pupil, (*b*) the burden thrown upon the teacher.

5. When are corrections effective? Consider how they may be made so in connexion with

(*a*) Home work generally.

(*b*) Arithmetic.

(*c*) Composition.

(*d*) Written translation.

6. It is said that women teachers spend much more time over out-of-school corrections than men. Why is this so? Do results justify the position?

CHAPTER XV.

ILLUSTRATION.

In far-off lands and ages yet to come, no Teacher will enter his Classroom without being prepared to make his hands help his head, and by rapid sketches to put before his Class in a vivid way all things capable of being illustrated by sight and pictured to the eye. And Photography will be called in to imprint the reality of men and cities and famous lands on untravelled readers, until no school shall be thought a school at all which does not use such helps more familiarly than the blackboards.—(Thring, *Theory and Practice of Teaching*, p. 137.)

WE all know the illuminating effect of a happy illustration at the moment when our minds are clouded with abstractions or far-reaching generalizations, the bearing of which we cannot for the moment make out. When first we heard the axiom, "If equals be taken from equals the remainders are equal," we may have been held up, as it were, by the unfamiliar formality of the language, but an illustration or two quickly set us to rights. This is typical of the true function of illustration. It clarifies our thinking, gives it life and

reality at moments when there is some danger of its thinning out into a mere maze of words.

The intercourse between teacher and taught is always subject to the difficulty which comes from the fact that what is easy and familiar to the one may be difficult and remote to the other. As we have previously pointed out, the very words they each use are sometimes sources of misunderstanding. In this particular relation, therefore, abundant use must be made of illustration which illuminates the unfamiliar and remote by relating it to the familiar and the (psychologically) near. It will be an indispensable element in all exposition. Indeed, we may fittingly speak of it as the handmaid of description, of narration, and of explanation.

We can conveniently regard illustration as being of four general types:—

1. The commonest form of illustration is the *example;* so common is it, that the terms *illustration* and *example* are often used synonymously. Thus every example in arithmetic is an illustration of a general rule; so is every example in grammar. We wish to illustrate the assertion that mountains are the home of freedom, we cite the examples of Greece, Switzerland, and the historic struggles in Wales and Scotland.

We often make a similar illustrative use of narrative and description. If we wish to impress our pupils with the vastness of the North American Continent, we let them read Stevenson's *Across the Plains.* The book gives content to vague words like *vast* and

immense by illustrating them. The same device is used in history teaching. We give "flesh and blood" to our story by apt citations from contemporary documents.[1]

2. An almost equally common form of illustration is the use of *analogy or simile.* Illustration by simile is an especially common form of verbal illustration. Thus we say of a man that "he stood firm as a rock," "his eyes flashed like lightning". Another illustrative use of the story is admirably exemplified in the parables of the New Testament. We are illustrating by analogy when we compare the relative size of the earth and the sun to a pea and a football; when we wish to emphasize the distance of places E. or W. of Greenwich, by comparing the times at the respective places—thus it is 3.45 a.m. at Vancouver when it is 5.30 a.m. at Winnipeg, 7 a.m. at Montreal, 12 noon at Greenwich, 1.15 p.m. at Cape Town, 5 p.m. at Bombay, and 10 p.m. at Sydney.

Comparisons of this kind can only be useful when at any rate one of the terms in the comparison is familiar to our pupils. There can be no advantage in comparing the Volga at Nijni Novgorod to the Thames at London Bridge unless our pupils know

[1] The excellent series, *Descriptive Geography from Original Sources*, edited by Dr. Herbertson (A. & C. Black), is an elaborate attempt to illustrate in this way the barren formalism of many geographical textbooks. In the subject of history many similar attempts to furnish illustrative material on these lines have been made. *V. English History Illustrated from Original Sources* (A. & C. Black), etc.

what our premier river looks like there. To speak of Stockholm as the Venice of the North, of Brussels as a miniature Paris, of George IV as the first gentleman in Europe, is commonly the merest verbalism. Nor is there much advantage in many of those numerical comparisons which some textbooks affect. To say that Everest is nine times higher than Snowdon can convey very little meaning to a boy who has probably the vaguest ideas of mountain heights of any kind. It seems simpler to say that Everest is so high that no man has yet been able to climb to the top, and it is surely richer in significance.

3. We now come to the type of illustration which, because of its concreteness, perhaps looms largest in the teacher's mind—*Objective Illustration*, using the term to cover all illustration that can be "sensed" by the pupil.

We use objective illustrations to supplement or to take the place of verbal description whenever this is likely to prove inadequate for our purpose. A description which would be possible and acceptable to an upper form might not suit a class lower down in the school, to whom an illustration of some sort would be necessary. Granted that one knows the general arrangement of a feudal castle, a description of a particular example might serve our needs. In the absence of such a background of knowledge, pictorial assistance could hardly be dispensed with.

The word is so loosely used, however, that we must remind the student of the sense in which we are using

it. People often speak of a book being "well illustrated". They mean by this that it contains many attractive pictures.[1] It may happen that the pictures have very little to do with the text; they are there for decorative effect. Such a use of the term would not be included in our discussion. An illustration illuminates an idea already somewhat vaguely held. When we are perfectly clear about the meaning of some statement, we do not need an illustration, though we may use one to make the idea clear to another person. It will be a useful check upon a certain kind of extravagance in school if the teacher will always ask what it is exactly that he wishes to illustrate, and whether illustration is necessary in the interest of clearness.

Again, we not uncommonly use the word to cover the actual objects we are going to use as sources of information. A teacher will, for example, centre his history or geography lesson round a well-chosen picture. Following his lead, the class make a careful study of it, gleaning at first hand all he wishes them to know. Similarly they may use a map to get out statistical information of various kinds. Neither the picture nor the map is an illustration in our sense of the word. There would be no objection to calling them such if this sort of confused thinking did not very often lead to confused practice. A teacher must be clear whether his "appurtenances" are to be used

[1] For an admirably illustrated book, in the right sense of the word, see Avebury's *Scenery of England*, or *The Elementary Geography* (several volumes), Oxford Univ. Press.

illustratively or as objects for direct study. Strictly speaking, an illustration should convey its message immediately ; it should be just the thing our pupils are waiting for to make a point quite clear to them. Here the familiar difficulty arises, that what seems perhaps an admirable illustration to the teacher may make no appeal to the children, or may appeal to them in an altogether unexpected way. Familiar instances of this sort of effect are frequently met with in primary schools as the outcome of experimental illustrations in elementary science. Compare the boys' attitude towards the pyrotechnic displays of oxygen or the friction machine.

One and the same object may of course be used illustratively or as a direct source of knowledge. We may describe the nomadic habits of the Bedouins and show a model of one of their tents, relating its structure to our description, or we may start with our model, let the class examine it, and by comparing it with the tent of a still more "unsettled" people, arrive at certain conclusions about the people who live in dwellings of the kind. Similarly we may use plants, animals, pictures in both ways to be determined by the circumstances and the purpose of the lesson. We must, however, be clear in our own minds what part exactly we intend our "materials" to play, as, of course, our treatment of them can only be determined in that way.

With this understanding we can now consider the various kinds of illustrative material and the use that may be made of them. Arranged in regressive order,

i.e. in the inverse order of their remoteness from concrete realities, we may use

1. Actual objects.
2. Models.
3. Pictures and photographs.
4. Diagrams, including maps.
5. Graphs.

1. It is hardly necessary to urge the advantage of using actual objects whenever that is reasonably possible. First-hand acquaintance with things is always better than second or third hand. It does not follow, however, that an object brought into a classroom gives first-hand acquaintance. The mere fact of having a thing before one's eyes or in one's hands does not make it a concrete illustration. An ordinary museum case is filled with "objects," but to many people looking at them they are as purely "abstract" as a mathematical formula would be. Stuffed birds and animals, dried plants, bits of granite and sandstone are very poor substitutes for reality. If our lessons are concerned with Nature, we must go to Nature, and study the living subject, its habits, its adaptive contrivances. In the same way we are not content to teach denudation by means of a working model, nor should we be satisfied with a classroom study of pond life centred round an aquarium. The rocks *in situ* are very different things from the cabinet specimens prepared for the teacher's use. Yet classroom work of the kind has a value—preparatory or supplementary as the case may be. We may use these "objects" to give certain no-

tions preliminary to an excursion, which in this way will serve the double purpose of illuminating what has already been studied, and of preparing the way for further study by raising new issues. The teacher should keep this two-fold aspect in mind if his excursions are to have any educational value, and their illustrative side will come first. An excursion which has not been carefully prepared for by much classroom work is bound to result in little else than idle "gaping about". There may be justification for it on other grounds—the joy of fresh air and movement, for example—but that is quite another story.

Important as first-hand acquaintance with things is, it is quite clear that this is often impossible. It is indeed easy to overestimate the value of actual objects as illustrative material. A school is unfavourably situated for geography teaching, we are told; the children have no mountain to look at, no sea, no island, no capes, etc., and we are to infer that real geography is out of the question. It is, of course, quite true that the intelligent traveller has richer geographical ideas than the untravelled person; that after climbing a mountain we realize more clearly how mountains are a barrier to intercourse and so on, but many of us have serviceable geographical notions without having had the advantages of wide travel. When we cannot supply our pupils with experiences of the kind, we must seek the best possible substitutes for them, and tell in human terms what great mountains, dense forests, vast rivers, etc., mean. With the help of pictures and stories even

young minds can transcend their environment and form very shrewd ideas of countries and peoples they have never seen. After all, historical teaching relies entirely upon illustrative material of this kind, and such knowledge of human nature as the pupils have at their command.

2. *Models* are, of course, a frequent substitute for actuality. The fact that they are in three dimensions often makes them easier to grasp than pictures or diagrams. A sectional model of a pump would give most of us a clearer idea of its working than a drawing; it is by the aid of a model that the student of chemistry learns to understand how bodies of the same molecular composition can have different optical properties; by means of a model we can most easily illustrate the faulting and bending of rocks, and so on. The feeling of concreteness and reality that the model carries with it makes it a favourite mode of illustration with young children. They delight in Noah's arks and miniature models of the animal world. A Chinese doll, a model of a Chinese wheelbarrow, will make a lesson on China a very real thing to them, and the teacher's model of Eskimo, Arab, Tartar, or Fiji dwellings are more exciting than the real dwellings would ever be.[1]

But we may easily over-elaborate our models and transfer the interest of the class from the thing signified

[1] R. L. Stevenson has caught this aspect of the child mind admirably in his *Child's Garden of Verses*—particularly in the group entitled "The Child Alone".

to the model itself. It was this danger which made Rousseau say : " Never substitute the sign for the thing itself save when it is impossible to show the thing ; for the sign absorbs the attention of the child, and makes him forget the thing it represents ".[1] Most of the models that have real value as teaching devices are very " rough and ready " representations that make no pretence at absolute truth. Their value lies in what they suggest, not in what they are. They are props to be dispensed with as soon as possible, and they often presuppose careful preliminary teaching in the presence of the actual objects. If a boy has made rough models showing the lie of the land round about the school, and rough representations of his idea of the structure of larger land units, much of value has been done, even though his scale was all wrong and his proportions were faulty.

The value of the model in such a case lies in the broad ideas it stands for. It may be quite wrong in detail and yet be valuable because the outstanding features of the thing represented have been caught. It is easy to waste the time of both teachers and taught in a vain endeavour to be accurate. Geographical models in particular should be such as can be rapidly worked up by teacher and class together. When the boys have knowledge and technique enough to model with accuracy, the model has been outgrown, and the map will have taken its place.

Again we would urge the distinction between the

[1] Rousseau, *op. cit.*, p. 141.

illustrative use of models and that other use which makes them the actual object of study. To begin a lesson on day and night with the usual lamp and globe is mistaken procedure, and much the same may be said of the usual way of attacking the problem of the seasons. Subjects of that kind ought not to be begun and finished in a short isolated series of lessons, but after a period of observations in the course of which problems and difficulties have been raised. The class then feels that it is the earth we live on and the things we live amongst that are the subject of inquiry, and that the bits of apparatus we bring in are puny illustrative devices of absolutely no importance in themselves. They serve their purpose and are put away to be forgotten. "You wish to teach the child geography," says Rousseau, "and you go in search of globes, spheres, and maps. What machines! Why all these representations? Why not begin by showing him the object itself, that he may at least know what you are talking about?"[1]

We see then that models are to be used with discrimination. They succeed best when they arise out of a need. This does not preclude our encouraging boys to put their ideas into concrete form, to invent and construct their own models in an effort to understand more completely some descriptive account of the locks of a canal, for example. From the teacher's standpoint the presence of a model does not make a good lesson. In not a few instances have we seen the

[1] Rousseau, *op. cit.*, p. 137.

teacher himself so taken up with his model that it has ceased entirely to be an illustrative device, as he originally intended. Before borrowing, or making, or using a model, it is absolutely necessary therefore to be quite sure just what purpose it is going to serve.

3. *Photographs and pictures* are happily becoming more available for school use, but it happens more often than not that the teacher cannot get just what he wants. The pictures available are in books perhaps, too small and too full of irrelevant detail. Children love colour and boldness and simplicity. They are apt to miss just what we wish them to see in the frequently overcrowded pictures of the publishers. There is nothing for it but to make them *ad hoc.* Blackboard illustrations are so temporary that it is surely worth while to put more careful work upon large sheets of good drawing paper. It is quite worth while for a young teacher to practice making enlargements in sepia, pastel, or water-colour in such a form that he can preserve them. A large flat folio of his own illustrations should be part of his "stock-in-trade". He will certainly never be able to buy as many as he will want, and even if he could, they would not be so serviceable as his own, which were made with a definite object in view.

The small Perry pictures and picture post-cards are most useful for individual work. They may be put in albums or hung in groups on the wall for a season. A mere post-card miscellany is of little use, however. If we are doing the geography of Ireland, a group of

typical coast scenes in north, south, east, and west would be most helpful, as familiarizing them with the relations of scenery and earth structure. Similarly, if we are studying the Norman period of our history, a series of post-card views of Norman churches and Norman castles, etc., would be of genuine service.

May we again insert the warning about illustrations in general? They must serve the specific purpose of illuminating the subject with which we are dealing. It is easy to waste time over pictorial material which is in no sense illustrative. The teacher must know exactly *why* he is going to use this or that picture and *how*.

4. *Diagrams and Maps.*—There is much difference of opinion about how and when we may begin to use maps. It comes partly perhaps from confusing a map with a plan. This identification of map and plan may be true of large scale ordinance maps, but the ordinary wall-map such as is used in school is not a plan in the ordinary sense. A political map, a population map, a rainfall map are diagrams simply. The orographical map which sets out to represent three dimensions consists of a series of superposed plans—provided, of course, the area is not too large. Owing to the sphericity of the earth we cannot represent any large area accurately, and we have to be content with a diagrammatic representation approximating to accuracy in varying degrees in different directions. The teacher must decide which particular form of error does not matter. A Mercator projection will serve for one purpose, for another he must have an equal area projection, and so on.

The problem therefore is, When can we expect to use diagrams to represent ideas? We wish, for example, to give a series of lessons on "Children of other Lands" to babes of seven. May we use a rough blackboard map? The answer seems to be, "Certainly". It will not represent in the child's mind what it stands for in ours. It would be a cardinal error to try and make it do so. All that will come later. We shall use it now as a diagrammatic representation of relative position, no better and no worse than the child's own diagram of the movements of Red Riding Hood. If we give him a pencil and paper, he will show us where the wood was, where Red Riding Hood lived, where her grandmother lived, and the path from one house to the other. He will pay little attention to proportion, and will probably draw the houses in elevation, but that in no way spoils the value of the diagram. It is a comparatively recent convention to draw maps as we draw them to-day.

This is not the place to follow the child through the course by which the intricacies of maps are revealed fully to him. He must, of course, ultimately be able to translate his orographical and structural maps into terms of space, and that will come most surely through combined work at modelling and diagrammatic representation of land forms as he knows them. All diagrams, even maps, get their value from the wealth of meaning which they suggest. A simple rainfall map comes as a revelation to the boy who has collected and collated rainfall data. He begins to see an order in

nature that is very impressive. But to force such a diagram on a class quite unprepared for it, having, that is to say, no experiences and no knowledge to which they can relate it, is sheer bad teaching.

The simpler a diagram is, the more direct its appeal, the better. A complicated diagrammatic representation is often worse than useless. Overloaded maps are cases in point. Those which a teacher makes for himself containing just the points he wants to make clear are always the most effective.

The use of diagrams in comparative statistics is becoming especially common. Diagrams of the kind are often very misleading, but even when perfectly honest in intention, there are obvious limits to their value for teaching purposes. We wish to give some idea of the relative position of English shipping in the world. Which is the most effective way of doing it? We may say that England owns 11,000,000 tons, Germany 2,500,000, and America 1,000,000, or we may draw lines to scale:—

England 11,000,000 tons.

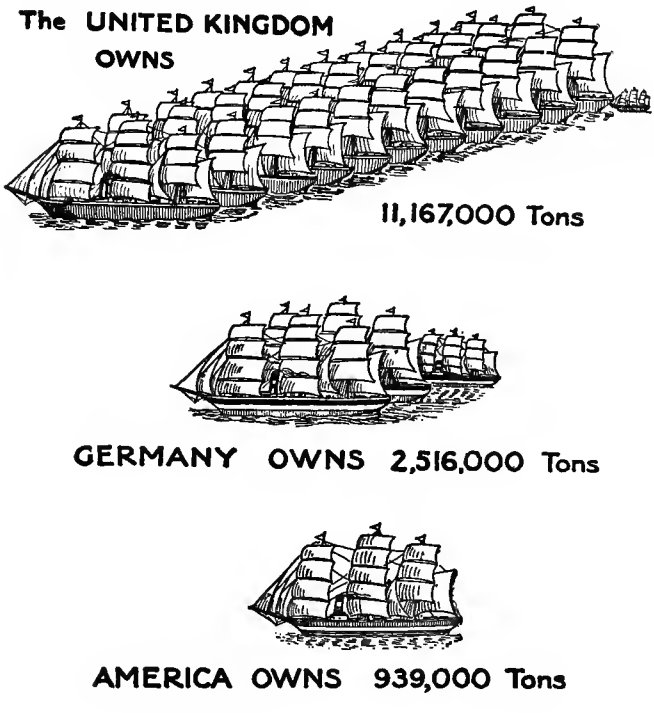
Germany 2,500,000 tons.

America 1,000,000 tons.

Or we may make a picture as on the opposite page.

Clearly the diagrams add a certain force to the figures, but without the figures they would convey nothing but vague impressions of "very much larger" or "about the same". Some teachers would urge that neither the figures nor the diagrams are so effective as approximate numerical ratios. But if we

learn that English shipping is more than four times as great as that of Germany, we may or may not ap-



(Figures for 1906)

Block received from Albert Broadbent, Manchester.

FIG. 15.

preciate what the real significance of the ratio is. A schoolboy certainly would not. He knows that a

cricket score of eight is four times a score of two, but there is a vast difference between such a comparison and a like one between scores of sixty-four and sixteen. He has a feeling for such matters which comes out of his experience. Statistics relating to walks of life quite foreign to him can never have that effect, howsoever ingenious we may be in our diagrammatic appeal. The solution of the difficulty seems to be to treat comparative statistics as simply as possible. At best they can mean very little, and many teachers prefer to show their boys how to get at them for special purposes than to make any attempt to teach them diagrammatically or otherwise.

5. This does not apply to the method of showing detailed and varying statistics by means of *curves* or *graphs*. A column of figures giving the average daily temperature for a month would not convey its meaning with anything like the same force as a graphic representation of the same data. No better example of the illuminating effect of an illustration could be found. It does not follow, however, that all figures and processes are clearer when worked graphically than they would be otherwise. Teachers sometimes forget this, and develop what might be regarded as a pretty illustration into what is nothing but a clumsy method. A Standard V class was working the following problem a few days ago:—

A can do a piece of work in twelve days, B can do the same piece of work in six days, how long will it take A and B working together?

The difficulty lies in the analysis of the question. If a boy can reason, A must do $\frac{1}{12}$ of the work in a day, and B $\frac{1}{6}$ or $\frac{2}{12}$ of the work in a day, i.e. they must do $\frac{3}{12}$ of the work in one day if they are working together; $\therefore$ it would take them four days to complete it, the problem is solved. Once he has grasped the idea he has got hold of a method of attack for any similar type of problem. Instead of this really powerful method, the teacher preferred to use graphic illustrations; thus :—

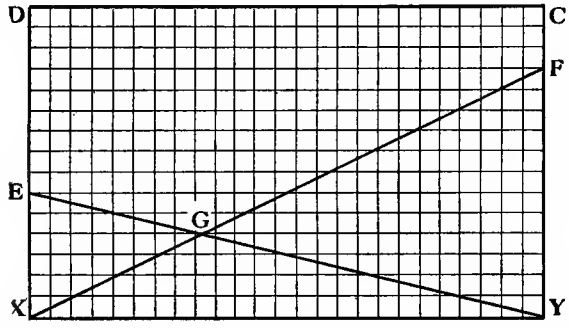


FIG. 16.

Let XY represent the work to be done.

This will take A twelve days to do, and B six days.

From X and Y draw vertical lines XD and YC respectively.

Along XD mark off a number of equal spaces.

Along YC mark off a number of equal spaces.

Let these represent days.

Count off six spaces along XD. Mark it E.

Count twelve spaces along YC, and mark it F.

Join EY and FX. Then EY represents B's line of progress.

Then FX represents A's line of progress.

These lines FX and EY intersect at G. Draw from G a line parallel to XD and measure it in terms of the divisions along XD and YC. There are four of these divisions in the line. ∴ A and B do the work in four days.

We have omitted the intervening questions that occurred during the demonstration. The student is recommended to consider what they would probably be and to consider also which of the two methods of working the problem is the simpler. The difference in power would best be realized if he could try the two methods with corresponding classes and as a rider gave another problem in which, the time of A and B together and of B alone being given, the question of A's time is to be determined.

Graphs, like all other illustrations, should be used when they give meaning to something which is not otherwise clear. In dealing with certain algebraic equations, for example, they may be illuminating to a beginner.

In conclusion we may repeat that illustrations are necessary only when a difficulty arises. Thus, verbal description often needs supplementing by pictures. A diagrammatical representation of a flower would be appealed to only when the children need helping over a difficulty. It is important to remember that neither illustrations nor experiments have any value in themselves, their significance lies beyond.

We may also remind the student that the use of pictures does not dispense with the need for verbal

description; no ordinary school picture can give the "atmosphere" of the desert or the prairie.

A good illustration soon wears out. Freshness, variety, spontaneity, are all factors that make for effectiveness in illustration.

Note on the Use of the Blackboard.

Every schoolroom is nowadays provided with at least one blackboard, and it is commonly regarded as an indispensable teaching instrument; that a teacher must always have a piece of chalk in his hand is one of the established rules of school practice. Although, in our view, a teacher may become a slave to the blackboard, it is nevertheless a first essential to effectiveness that the teacher should master its technique. The young teacher should practice steadily until he can write rapidly, neatly, and legibly, and make rough diagrams on the blackboard without turning his back completely upon his class. He must remember that he is writing for the whole class and not for the children in the front row. Occasionally, of course, he will have to do more painstaking work, but ordinarily his success in work of this kind will depend upon the ease and naturalness with which it is done. The accomplished teacher does not draw attention to his technique by saying: "Now, I shall put that on the blackboard," and allow a long pause to follow whilst he fulfils his promise. The word, the drawing, the formula, the figures all appear as they are wanted, as if they were inevitable.

It is commonly urged that the blackboard should be used on every possible occasion, because in that way we are fulfilling another classical behest: "Make your appeal to the class through as many senses as possible". There are, of course, not many *objects* which can themselves be brought before the class in this way —the form of letters, figures, and words, the proper arrangement of arithmetical operations, geometrical and other plane forms, and other like matters exhaust the list. As our language is so irregular in its written forms, we are particularly dependent upon memory pictures for our standards in spelling, and we must habitually use the board for enforcing verbal appearances.

But although the list of things which can actually be shown to a class on the blackboard is so small, we have clearly not exhausted the occasions when it should be used. Much of what has been said about illustration has an intimate bearing upon the subject. Illustrative drawings, maps, etc., may be made on the board or on large sheets of paper. It is not, however, wise to make elaborate drawings which must so soon be destroyed. The blackboard is meant for rapid work which accomplishes its immediate purpose and then disappears. Above all, it is useful for those impromptu illustrations which clear up unexpected difficulties as they arise in class discussion. At such times a teacher should never hesitate to draw because he thinks himself an incompetent draughtsman. The question is, can he make his meaning clear in line

when words would probably fail; if he can accomplish that, no member of his class will pass judgment on his draughtsmanship.

Many teachers make a practice of writing a summary of every lesson either before it is given or whilst it is proceeding. Head masters of experience like to know just what the teacher is doing when they enter the classroom, and look to the blackboard to tell them. Any rule of the kind usually does more harm than good. In the first place, it leads both teacher and class to fix their attention on the summary itself, rather than on that for which it ought to stand. This is actually exaggerated by the not uncommon practice of requiring the boys to enter the summary into their notebooks. It is clear that such a procedure gives the class no training in taking notes themselves; in this as in most other cases we should not anticipate our pupils' efforts by putting our models before them. Even if we deprecate the practice, they will scarcely be able to resist the tendency to copy.

There is the further danger of our pupils thinking that they are only expected to remember what appears on the board; indeed, teachers themselves countenance this error not only by their elaborate summaries but by calling upon the class to read it systematically through at the end of the lesson. All the life and colour of the lesson—if there were any—is lost in such a practice. Better almost to neglect the blackboard altogether and trust to the pupils' own notes or to the vivid impression the lesson has made, than to run such

a risk. There is, however, no need of that. If a few significant words or phrases only are set down, serving to show at a glance the content or movement of the lesson, but not to summarize it, there will be no danger of that sort. So far then from the blackboard revealing the lesson to a casual visitor, it can only reveal it to those who have been present all the time and for whom each word is pregnant with suggestion.

There is one other point of practical importance. Whether the blackboard is used much or little—and, of course, this will vary enormously according to the nature of the subject—what is there should be neatly arranged. Confusion is apt to come through not starting with "a clean slate". The board should be clean at the beginning of the lesson and what the teacher writes should show some sense of neatness and arrangement. Confused and untidy work is bound to be reproduced in the pupils' books, nor can the teacher justly complain.

We may, in conclusion, advise the beginner not to allow boys to come from the class to write on the blackboard. On rare occasions perhaps it may be the simplest way out of a difficulty, as when a boy is ineffectively describing something which he could make clear by the crudest drawing, but it is more often the cause of much waste of time and not infrequently a source of disciplinary trouble. Experience will tell when the procedure is likely to be useful.

EXERCISES.

1. Study an ordinary class reading-book in geography, in history, in literature, with a view to finding out how far the pictures really supplement and illuminate the text, how far they seem to have no *immediate* connexion with the subject-matter, how far they are chosen for decorative effect.

2. What illustrations would you make use of in explaining trade winds to a class of thirteen-year-old boys?

3. A class of eleven to twelve-year-old boys are doing the geography of India. The teacher draws a large outline map, and pins over it in various places a piece of cotton, a poppy head, a piece of timber, a coffee berry, etc., etc. Discuss the value of this as an illustration.

4. "In any study whatever, representative signs are of no account without the idea of the things represented."—(Rousseau.)

Give examples falling within your own experience of teaching "signs without the idea of the things represented" (*a*) in history, (*b*) in geography, (*c*) in mathematics.

5. What objective or other illustration would you use in giving a lesson on the folding and faulting of the earth's crust, to bring out (*a*) the fact that, for folding, lateral pressure must be used, (*b*) that, with slow folding, even a very brittle substance can be bent into a hoop without snapping?

6. What illustrative value has a time line (*a*) in a particular history lesson, (*b*) in the general history course? What other illustrative helps to the formation of a "time sense" have you seen?

7. Your class is keeping weather records; devise a chart

that might hang in the classroom and be useful for *illustration* in an ordinary lesson.

8. How would you illustrate to a class the fact that a sphere, e.g. the earth, can have two different motions at the same time? What preliminary observational work would you take before attacking the problem?

9. Give three examples of rough diagrammatic blackboard sketches useful in history teaching—not being plans of battle-fields or maps, and say exactly when and how you would use them.

10. You wish to illustrate the working of a canal system, with its different levels of water. How would you do this? What preliminary description would you think necessary in order to make illustration welcome?

11. How would you try to illustrate the fact that the space travelled under the action of gravity is proportional to the square of the time?

12. In giving a lesson on the Rhine to boys, ages ten to eleven, set out six pictures you would like to have as illustrations.

13. Quote three pieces of poetry you would use illustratively in a history course. What exactly would be your object in using them, and how would you try to attain it?

14. Make a careful record of all the "impromptu" illustrations you hear during the next six lessons you attend. Describe the occasion in each case, and estimate their effectiveness.

15. Make a similar record of the unexpected difficulties you meet during the next three lessons you give yourself, and show what use you made of illustrations in overcoming them.

Have you thought of better ones since the lessons? What are they?

16. Read Matthew Arnold's "Sohrab and Rustum". What illustrative "asides" do you note in the poem. Describe their effect on your own mind from the point of view of the appreciation of the story.

17. Estimate the relative advantages of pictures, outline drawings and photographs as illustrative material for children in studying geography or history. What difference does the age of the children make?

18. Under what conditions are carefully coloured pictures preferable to models in giving a course of lessons on other lands and other peoples to children of 8 to 9? Try to find out which children really prefer, and why.

CHAPTER XVI.

SUGGESTION—DISCIPLINE.

The system is lost in the man.—(Stanley's *Life of Arnold.*)

NO words could form a more fitting introduction to the study of suggestion in teaching. Dean Stanley has been considering Dr. Arnold's principles of education as distinct from himself, but he proceeds, "in proportion as we approach his individual teaching, this becomes impracticable—the system is lost in the man—the recollections of the head master of Rugby are inseparable from the recollections of the personal guide and friend of his scholars".

Let us first examine two accounts of Arnold's methods taken from the same source:—

The interest in their work which (Arnold's) method excited in the boys was considerably enhanced by the respect which, even without regard to his general character, was inspired by the qualities brought out prominently in the ordinary course of lessons. They were conscious of the absence of display, which made it clear that what he said was to instruct them, not to exhibit his own powers; they could not but be struck by his never concealing difficulties and always confessing ignorance; acknowledging mistakes

in his edition of Thucydides, and on Latin verses, mathematics, or foreign languages, appealing for help or information to boys whom he thought better qualified than himself to give it. Even as an example, it was not without its use, to witness daily the power of combination and concentration on his favourite subjects which had marked him even from a boy; and which especially appeared in his illustrations of ancient by modern and modern by ancient history. The wide discursiveness with which he brought the several parts of their work to bear on each other; the readiness with which he referred them to the sources and authorities of information, when himself ignorant of it; the eagerness with which he tracked them out when unknown—taught them how wide the field of knowledge really was. In poetry, it was almost impossible not to catch something of the delight and almost fervour with which, as he came to any striking passage, he would hang over it, reading it over and over again, and dwelling upon it for the mere pleasure which every word seemed to give him.[1]

It is difficult to describe, without seeming to exaggerate, the attention with which he was heard by all above the very young boys. Years have passed away, and many of his pupils can look back to hardly any greater interest than that with which, for those twenty minutes, Sunday after Sunday, they sat beneath that pulpit, with their eyes fixed upon him, and their attention strained to the utmost to catch every word he uttered. It is true, that, even to the best, there was much, and to the mass of boys the greater part of what he said, that must have passed away from them as soon as they had heard it, without any corresponding fruit. But they were struck, as boys naturally would be, by the originality of

[1] Stanley's *Life of Arnold*, Vol. I. d. 145.

his thoughts, and what always impressed them as the beauty of his language, and in the substance of what he said, much that might have seemed useless, because for the most part impracticable to boys, was not without its effect in breaking completely through the corrupt atmosphere of school opinion, and exhibiting before them once every week an image of high principle and feeling, which they felt was not put on for the occasion, but was constantly living among them . . .

On many there was left an impression to which, though unheeded at the time, they recurred in after life.[1]

The key to Arnold's influence is found here. His high-mindedness, combined with deep moral purpose, his evident interest in and sympathy with his boys, led them to respect and, it may be, venerate him ; and thus he gained a prestige in their eyes that gave all he said and did an authority and a forcefulness beyond the common. In the classroom his scholarship, his evident delight in the pursuit of knowledge, his even temper and readiness to applaud real effort, his personal simplicity and his skill in securing the co-operation of the boys, produced an attitude of mind among them at once receptive and critical, that reflected something of the high purpose of their master. In some subtle way their whole outlook had undergone a change, they felt it themselves, though few, if any, would at the time have been able to say exactly how it had come about. Only as they looked back in after years did they recognize the suggestive influence of a great teacher. Their moral standards, their opinions, their intellectual

[1] Stanley's *Life of Arnold*, Vol. I. p. 172

habits, all owed something to the personality of this one man. System and method there must be in teaching. Arnold was fully alive to its value, just as Thring was at Uppingham, but the spirit must be there too.[1] This is so important, that the young teacher should grasp the profound significance of personality, and the part it plays not only in school education, but in the wider sphere of life. It is best studied in the concrete, and no better examples can be found than in the world of oratory. The student should look carefully at the following extracts.

Francis Place, writing of Feargus O'Connor, one of the "physical force" Chartists of the fifties, says :—

O'Connor's oratory was desultory, vague, shallow, wandering, misleading. Yet both the manner and the words of O'Connor are well adapted to the heterogeneous assemblages he addresses. His statements are put forward with all the confidence of a man who thoroughly understands what he talks about. The air of mastership he puts on, the matter being in detached portions, and consequently compressed in short essays, his general earnestness and good humour, tell well upon the unread and loose-thinking people, and constitute him the ablest mob orator of the day.

Multitudes of men, relying upon what he and others had told them at public meetings of the absolute power of themselves, whom they called the people, were satisfied that the whole body, or nearly the whole body of the working people were fully prepared for action. They also believed that, when O'Connor said "Universal Suffrage would be the law

[1] The student is recommended to read in this connexion How's *Six Great Schoolmasters.*

of the land on a certain day," that it would be as he said; and with equal credulity and absurdity they now believed that Universal Suffrage would be the law of the land within three months from the meeting of the Convention.[1]

Compare now the following account of a speech given by Gladstone at the Edinburgh Corn Exchange during his famous Midlothian campaign. He spoke for one and a half hours, attacking the Government finance :—

It was Demosthenes, not Isocrates. It was the orator of concrete detail, of inductive instances, of energetic and immediate object; the orator confidently, and by sure touch, startling into watchfulness the whole spirit of civil duty in a man; elastic and supple, pressing fact and figure with a fervid insistence that was known from his career and character to be neither forced nor feigned, but to be himself. In a word, it was a man—a man impressing himself upon the kindled throngs by the breadth of his survey of great affairs of life and nations, by the depth of his vision, by the power of his stroke. Physical resources had much to do with the effect; his overflowing vivacity, the fine voice and flashing eye, and a whole frame in free, ceaseless, natural, and spontaneous motion. So he bore his hearers through long chains of strenuous periods, calling up by the marvellous transformations of his mien a strange succession of images—as if he were now a keen hunter, now some eager bird of prey, now a charioteer of fiery steeds kept well in hand, and now and again we seemed to hear the pity or dark wrath of a prophet, with the mighty rushing wind, and the fire running along the ground.[2]

[1] Quoted by Jephson, *The Platform*, Vol. II. p. 256.

[2] Morley, *Life of Gladstone*, Vol. II. p. 151 (popular edition).

The final extract is even more instructive. It refers to the budget debate of 1852 in the House of Commons, as reported in "The Times":—

Mr. Disraeli's speech was in every respect worthy of his oratorical reputation. The retorts were pointed and bitter, the hits telling, the sarcasm keen, the argument in many places cogent, in all ingenious, and in some convincing. The merits were counterbalanced by no less glaring defects of tone, temper, and feeling. In some passages invective was pushed to the limit of virulence, and in others, meant no doubt to relieve them by contrast, the coarser stimulants to laughter were very freely applied. Occasionally, whole sentences were delivered with an artificial voice, and a tone of studied and sardonic bitterness, peculiarly painful to the audience, and tending greatly to diminish the effect of this great intellectual and physical effort. The speech of Mr. Gladstone was in marked contrast. It was characterized throughout by the most earnest sincerity. It was pitched in a high tone of moral feeling—now rising to indignation, now sinking to remonstrance—which was sustained throughout, without flagging and without effort. The language was less ambitious, less studied, but more natural and flowing than that of Mr. Disraeli; and though commencing in a tone of stern rebuke, it ended in words of almost pathetic expostulation. . . . That power of persuasion which seems entirely denied to his antagonist, Mr. Gladstone possesses to great perfection, and to judge by the countenances of his hearers, those powers were very successfully exerted. He had, besides, the immense advantage resulting from the tone of moral superiority which he assumed and successfully maintained, and which conciliated to him the goodwill of his audience in a degree never attained by the most brilliant

sallies of his adversary, and when he concluded, the House might well feel proud of him and of themselves.[1]

The extracts are instructive: personal prestige resulting from assurance and good humour gave the sayings of O'Connor the weight of gospel to untutored and uncritical minds. High purpose, thorough knowledge, and good humour, combined with great physical attractiveness, gave Gladstone a marvellous hold over popular audiences, and secured for himself ardent adherents even when half of what he said was never understood. In Parliament his character and personal charm won the highest regard though he was not always so successful in leading a critical House. When Disraeli carried conviction, it was by his intellectual prestige, though he probably never attained the same hold upon his following as his great rival, who combined great moral fervour with intellectual predominance. He could reach the emotional side of men much more readily than Disraeli, disarming criticism so completely that what he said was accepted with profound conviction, even in the absence of logically adequate grounds. Such a process of communication is exactly what is meant here by suggestion,[2] and people are said to be more or less suggestible, as their minds are open to fresh convictions of this kind. The least suggestible people are those who possess "a large store of systematically organized knowledge which they habitually bring to bear in criticism of statements made to them,"

[1] Morley, *Life of Gladstone*, Vol. I. p. 227 (popular edition).

[2] Cp. McDougall, *Social Psychology*, pp. 97, 98.

self-reliant men who trust in their own judgment. In general, women are more suggestible than men; their emotional life is stronger. Our critical powers are also always an easy prey to our emotions.

Just as men vary in their suggestibility, so do they vary enormously in their suggestive power. We all know people whose words at once arrest attention, men who are listened to with respect on all occasions, whilst others carry no weight whatever. It is just one of those everyday facts which teachers should study to understand. Sometimes it is the magnetism of personality which gives men great influence over their fellows; sometimes it is the sheer force of their convictions which carries everything before it; sometimes it comes in large measure from that indefinable quality called tact—a good manner and a cultivated voice are perhaps contributory. Yet Pestalozzi, who was utterly without personal charm of any kind, inspired a continent. Intellectual prestige alone will give men power of this kind, but when it is combined with personal charm and genuine emotional fervour, there are hardly any limits to the suggestive influences it may bring.

The whole question of suggestion is of first importance to the teacher, because of the peculiar suggestibility of child nature. This is partly due to children's "lack of knowledge and the lack of organization of such knowledge as they have," and partly "to the superior size, strength, knowledge, and reputation of their elders" which tend to invoke the impulse to

submission, and to throw them into the receptive attitude.

Theirs is a case of what is called "prestige suggestion". But children are not receptive of the influence of suggestion in an equal degree in the presence of all their elders. Teachers, as others, vary in their suggestive power, and many of the difficulties of the beginner are due to weakness in this respect. Other things being equal, the man of riper years will exert a quiet influence upon his boys which is the envy of his younger colleagues. Work proceeds smoothly at all appropriate times. How he does it is a mystery to the novice in whose hands the class becomes restless and even uproarious. The difference is, of course not due merely to age. The quiet confidence which comes from experience accounts for much. The older teacher does not anticipate difficulties. He knows his own strength; he is clear about the things he wants; his boys have learned his worth. He is their intellectual superior, and they know that he is devoted to their good. Even with a new class, his calm assurance and unruffled temper win respect and confidence in the first half-hour. The young teacher, on the other hand, is uncertain of himself in his new position, and he is apt to overdo the tone of authority. He relies, that is to say, upon the coarse rigours of the law rather than upon the more delicate influences which suffice for his older colleague. He has, in consequence, very frequently to go through a hard struggle, and when the victory is won—as of course it must be—he has

to deal with a more or less sullen class. It is true that boys and girls are very forgiving, and if the teacher who has gained his position over them by the use of *force majeure* is wise, he will study the ways and means of establishing his authority afresh upon foundations of mutual respect and regard. A permanent attitude of hostility between teacher and class sets up "contrary" suggestion which is inimical to good work. Under the pressure of fear, his pupils may achieve creditable results in an examination, but they will dislike their work, question its value, and put it all aside as a hateful reminiscence so soon as school days are over.

The teacher must therefore aim at convincing his class that he is genuinely interested in every one of them, that he is keen to help them, and that he is thoroughly competent to do so. He must be a hero in their eyes, and though physical prowess gives an easy first access to a leading position in their minds, in the long run it is the intellectual and moral prestige of the teacher that matters most. The greatest schoolmasters have not, as a rule, been great athletes.

On the side of instruction we have already discussed many of the conditions of success, but the teacher's efforts in this direction may suffer in spite of the formal correctness of his methods. Many of his lessons deal with facts which do not admit of demonstration. He cannot prove the truth of the historical details it may be his duty to set forth, yet he must leave a vivid impression, alike of their truth and of their significance,

upon the minds of his pupils. When this is not accomplished, he has taught little more than words which may be learnt for purposes of reproduction, but he has not touched the real life of his boys. They will never question the truth of what they learn; they do not care enough about it to do that. This sort of effect is the common result of an unenthusiastic, lackadaisical, or routine style of teaching. Enthusiasm, alike for the subject and for the boys, is particularly necessary in those parts of school work which make no obvious appeal to the boy's sense of what is useful. In literature, for example, and in history, effectiveness in this deeper sense can only come from the sincerity of the teacher, and from the inspiring qualities of his work. Given abundant knowledge, a sound sense of proportion, and a sympathetic acquaintance with boys' ways of looking at things, he will soon secure that intellectual hold upon his class which will make his work convincing and fruitful. This is the quality which is properly called *Suggestion* in teaching.

What is absolutely necessary to the successful teaching of literature and history is only less so in the teaching of all the subjects of the school course. A suggestive teacher of mathematics will not improve the logic of his subject, but he will communicate a feeling for it which will carry a pupil much further than a routine treatment. This is equally true of nature study. No subject of the curriculum is more brimful of possibilities than this, yet in not a few schools it is a dreary series of abstract unrealities, suit-

able perhaps for the botanical laboratory, but entirely out-of-place in our early efforts to lead children to love the fields and the trees and the flowers. But we can never achieve that, unless the love for these things is in ourselves.

The suggestive influences of school life will not, however, be confined to lessons. The whole organization of the school should be pregnant with suggestion. The pervading atmosphere of work, of seriousness of purpose, the outward signs of mutual consideration and regard, the joys of mutual service, the common feeling of loyalty to school traditions, are all suggestive in the highest degree. The pupils acquire convictions in regard to matters of conduct, of work, and of duty long before they can put them into words, and though they may never hear "a moral lesson," they will in this way have acquired such foundations of the good life as are wellnigh imperishable. Similarly, school decorations, school pictures, school music, and school literature are of far-reaching importance, as laying the foundations of standards of taste by their suggestive force. At this stage in life the quiet force of example is richer in suggestion than precept, "for the letter killeth but the spirit giveth life".[1]

EXERCISES.

1. Think of three of your most cherished "convictions"; consider to what influences these owe their strength.

[1] The student is recommended to refer back to the chapter on Imitation.

2. What school of your acquaintance has the greatest reputation? Is this due to examination successes? If not, how do you account for it?

3. What are the most "intimate" recollections of your school life? How do you account for them?

4. Study the methods of a "popular" preacher or orator, with a view to finding out whether he owes his power (*a*) to his proved capacity in affairs, (*b*) to his emotional appeals, (*c*) to the loftiness of his personal ideals, (*d*) to the subtle flattery of his audience, (*e*) to the intrinsic value of what he says.

5. Tell this story to classes of various ages and if possible to boys and girls separately, and, with a view to estimating the developing critical power of children, reckon the percentage of those of each age and sex who discover the inherent absurdity.

A French officer, coming into a wine-shop in Paris, heard an old soldier boasting of his battles, his wounds, and losses. "I have lost my right arm," he said lastly, "but it was for France and the Emperor; and for them I would gladly give the other arm." "That is all very fine," remarked the officer; "it is easy to boast when you are safe, but if it came to the real thing, it might be different". The brave man rose from his seat, drew his sword, and cut off the other arm.

6. "Other things being equal, the man who knows most about his subject will be the best teacher." Why is this so?

7. Make a special effort in the next six lessons you hear to estimate their "suggestive" value and to determine specifically the reason for such values as you give them.

8. Why do you attend lectures on subjects which are adequately treated in textbooks? Does your reason apply all round? If not, why not?

9. Place two equal circles of about six inches radius on the blackboard, and write the numbers 217 in the one and 168 in the other. Ask the various classes in the school which is the larger circle. Tabulate and account for the results.

10. How would you expect suggestive work in geography to reveal itself to a visitor (an inspector, let us say) in a school?

CHAPTER XVII.

NOTES OF LESSONS.

A dull boy's mind is a wise man's problem. . . . The true teacher has to fit himself to the mind he is teaching, not the pupil to fit himself to the teacher . . . St. Augustine hit the point when he said of teaching, "a golden key which does not fit the lock is useless, a wooden key which does is everything". He might have added, with advantage, that using one big key for all locks is idiotic.—(Thring, *Theory and Practice of Teaching.*)

WE have been concerned hitherto to set out the fundamental processes which enter into the daily practice of the classroom, so far, at least, as that is concerned with instruction. As the teacher and his class pass from lesson to lesson, and from subject to subject, they pass from one activity to another—now the teacher is explaining, now he is describing, at this time the pupils are actively imitating a model set for them to follow, at another time they are doing their utmost to express their own ideas clearly and effectively. What particular procedure is adopted during any lesson must depend upon the nature of the subject, the age of the children, the time and the resources at the teacher's

disposal. Even within the limits of a single lesson procedure may vary. We may begin by expounding and then set the class to investigate for themselves some problem which has been raised; we may give up a whole lesson period to analytical questioning, or we may scarcely ask a question during a whole half-hour. Freedom is a *sine quâ non* to first-rate teaching, but freedom does not mean absence of principle, nor does it mean reliance upon *ex tempore* inspiration. The teacher who rightly feels free is the teacher who has thought out his procedure most carefully.

It is customary to require the young teacher to set out briefly his plans in writing before he gives his lessons. If this is well done, it is possible to see at a glance the line he proposes to take, on what assumptions it rests, and the goal he proposes to reach. Such outlines are called "Notes of Lessons". Many attempts have been made to reduce such plans to a common form. The most famous of these we owe to Ziller, who was Professor of Education in the University of Leipzig from 1864-82. Herbart, taking a large view, had shown in general how knowledge and interests develop in our minds. We begin by being clear about details, these details we compare, and lay hold on the uniformities that underlie the variety, so introducing system into the chaos of our experiences, pursuing this tendency to systematize further until we finally arrive at some great principle which gives meaning to the whole of life. This is, of course, only a very rough way of presenting Herbart's doctrine, and

it was not in this form new. But he embodied it in his doctrine of education, and insisted upon its importance to the art of instruction. Now Ziller tried to apply this broad teaching to every lesson, or to force lessons into groups, the procedure in which could be drawn up on the lines of these four steps in the development of knowledge. In this way the five so-called "formal steps" were invented. They are unfortunately commonly attributed to Herbart, who was, however, much too great a master ever to have approved of the formal rigidity of Ziller.

We have only to consider the variety of procedure already discussed in the chapters of this book to convince ourselves that lessons cannot be fitted into any common formula. We may, perhaps, realize this better if we try to group different lessons into types, according to the particular feature which characterizes their procedure. This might be any one of the following:—

(*a*) Exposition by the teacher.
(*b*) Investigation by the pupils.
(*c*) Expression by the pupils.
(*d*) Practice in order to gain facility or technique.
(*e*) Private study.
(*f*) Revision.
(*g*) Æsthetic enjoyment.

The list is not exhaustive, but most actual lessons will fall into one or other of these groups. However that may be, if we tried to find any common feature in the procedure of all lessons, we should probably get no

further than saying that most lessons have a characteristic beginning, middle, and end. Our notes must therefore pay attention to these three parts of a lesson where they can be distinguished as such. They must indicate how we propose to set out, what line the main body of the lesson will follow, and how we intend to gather up the threads, so to speak, in order to bring the lesson to an effective close.

In school, of course, no lessons are given in isolation. They belong to a course which has been drawn up with a general object in view, and the treatment of the several lessons in the course—what to omit, what to include in the subject-matter, whether the expository or an investigational method is to be adopted, etc.—will depend upon the teacher's conception of his scheme as a whole. To fail to keep his whole purpose in view is sure to result in loss of proportion and undue hurry at the end.

Even experienced teachers find this planning out of their course a necessity. Thring insisted upon its importance in his usual racy way. "A teacher ought to make a definite scheme in his own mind, and enter it into his private memorandum book to which he works day by day, and keeps to the path, never losing sight of the track. . . . Many a master runs about mentally, just as if he were trying to catch geese on a common." [1]

A teacher who has thought out his course as a whole

[1] Thring, *Theory and Practice of Teaching*, p. 203.

has not, however, solved the problem of its various parts. He may, for example, be in charge of the literature course in an upper standard of a primary school. He has selected his pieces for study in the hope of contributing in some measure to the formation of sound taste in reading. Such a result will depend largely upon the mass of work that is done, but there is no common method of dealing with the various literary treasures he proposes to take. Every piece presents a special problem. Treatment that might serve for "Hiawatha" would end in failure if he used it for "Tristram and Iseult," nor could he deal with "In Memoriam" as he might with the "Idylls of the King".

So in nature study we may hope to set up an interest of a certain kind, and each lesson will be framed with that idea in view, but we shall vary our method according to our subject. We shall study the earthworm in a different way from the squirrel, and treat the potato differently from the ivy. What would be possible with boys of twelve would not be possible with children of eight, even though the subject of the lesson were the same.

Thus, what is called the Method of a particular lesson is simply our particular mode of dealing with it in the light of the general aim of the course, the particular aim of the lesson, and our knowledge of the class we are going to teach. When we ask such questions as, How am I to arrange the subject-matter so as to make the strongest possible appeal to the children? Must I tell or must the children find out?

What use must I make of narrative, of description, of illustration? How far back can I push such and such an explanation?—we are raising questions of method.

There is no one method of giving any lesson. Method is, or should be, a reflection of the teacher's individuality, and if we asked twenty good teachers to give the same lesson to similar groups of children, we should find them adopting twenty different methods of approach. Similarly, there is no general scheme under which notes of lessons can be drawn up. Moreover, when we have considered the problem of the lesson, and have set out our proposed plan in the form of notes, we must not suppose that the course of the lesson itself is finally settled. Our plan is only tentative at best. Many things may occur which would make it advisable to give up our plan and adopt another. We have had to consider, for example, what knowledge we might fairly assume the class to have, but, when we come to the classroom, we find our assumption not justified. We may have over-estimated or under-estimated their powers. Hence, we must be so steeped in our subject that we can adapt ourselves to either circumstance. Even in the middle of our lesson a difficulty may arise which it is necessary to deal with, though we had not counted on it. Many young teachers are easily led into side tracks in this way, and to save themselves from this danger they are apt to adhere too slavishly to their notes, when an experienced teacher would free himself from them. This sort of thing has led schoolmasters to object altogether

to the idea of notes of lessons. Nevertheless, we strongly advise their careful use, always with the proviso that the teacher should feel himself free to deal with the actual situation as the occasion demands. He has thought about his lesson with a view to freedom, not with the intention of forging a chain of procedure about himself.

The exercises contain specimen notes of lessons of various kinds. They are intended to be suggestive only, and are offered for criticism ; *they are not patterns.*

EXERCISES.

1. "Every method has some good in it; no method is all good." Criticize this statement.

2. Compare the following drafts of lessons (*a*) on Decimals, (*b*) on Pulleys. Which of each pair do you prefer? Why?

A First Lesson on Decimals.

A (1). (Standard III. Children of nine.)

Knowledge Assumed :—

(*a*) The decimal notation for whole numbers.

(*b*) Elementary knowledge of vulgar fractions.

Purpose of Lesson is to extend decimal notation to fractions.

Preliminaries.—Teacher questions on two values of figure :—

(*a*) place,

(*b*) intrinsic or ordinary.

Subject-matter and its Treatment :—

(i) To express a fraction in decimal notation.

By means of blackboard diagram and figure "1" in cardboard, teacher shows that by moving figure one place to LEFT we increase its value ten times; and, similarly, that by moving figure one place to RIGHT we decrease its value ten times, and, hence, deduces law governing such series as 111, 333, viz. *increasing* throughout from RIGHT to LEFT by using ten as multiplier, and *decreasing* throughout from LEFT to RIGHT we decrease by using ten as divisor, i.e. $\frac{1}{10}$ as a multiplier.

Teacher directs attention to tenth-inches on ruler, and children are told to measure the width of their papers; teacher asks for other ways of writing $\frac{6}{10}$ in.—e.g. 6 tenth inches, ·6 in. Children measure certain definite lines drawn on paper expressing their results in decimal form.

Teacher questions on method of expressing hundredths, thousandths, etc., and on the effect of "0" (1) in ·706, (2) in ·760.

(ii) Drill in reading and writing decimals.

Generalization.—Children tell three ways of writing tenths.

Exercises on Subject-matter.—To be worked mentally:—

·5 of £1, ·1 of 10s., ·2 of 2s. 6d., ·4 of 10d.
·5 of 1 ft.

A (2). (Children of nine.)

Knowledge Assumed:—

(*a*) Decimal notation of whole numbers.

(*b*) Rudimentary notions of fractions (quarters, halves, fifths, etc.).

Step I.—Revision of children's ideas of notation, *leading* to statement of underlying principle of place values. Thus, they will tell that the value of the figures in the number

333 increases tenfold as we move from right to left, because the place values go up tenfold.

Problem.—How do we indicate place value of figures in such a number as 596?

(i) H. T. U.
5 9 6
(ii) in speech—5 hundreds
9 tens (ty)
6

Step II—Problem.—Now, can we apply this principle to numbers less than unity? What shall we call the figures to the right of the units' place if the same principle of change in values is continued?

Hundreds, Tens, Units, Tenths.
5 9 6 4

Step III—Problem.—How do we know what the place of value of ordinary numbers is? e.g. 6172. Custom is to regard right-hand figures as units. Suppose we know that one number includes figures which tell of values below units, how shall we know? Tell class the convention.

What then does 763·42 mean? What does ·5 mean?

Step IV—Problem of Addition.—Add 76 to 3060. Why is it written thus—

3060 3060
76 and not 76 ?

Apply same principle to 7·6 + 3·3; 3·7 + 2·41.

Exercises involving principle:—

7·6 + 31 + ·4; 41·76 − 38·9; etc.

Answers to be written in figures and in words.

How Pulleys Work.

B (1). (Standard VI. Boys, age twelve.)

The boys are assumed to know something of the lever, and also that a pull is equally distributed throughout a

string. The probable course of the lesson, which may lead to a generalization, is :—

Preliminaries.—Experimental talk on methods of raising weights—the advantage of a downward pull—the pulley as a means of getting rid of resistance.

Subject-matter and its Treatment.—How pulleys work :—

(i) The pulley examined.

(ii) The fixed pulley. Examination and experiment will establish that ideally the power = the weight when the system is at rest. The influence of friction shown experimentally.

(iii) The single movable pulley. Examination suggests that in this case the power = half the weight. Experimental investigation supports this, but emphasizes the importance of friction.

Exercise on Subject-matter.—A system of five pulleys (in two blocks) connected up by a single cord shown. Boys to tell the ideal relation of power to weight raised.

B (2). (Boys, age twelve to thirteen.)

Preliminary Questions.—For study some days before the actual lesson comes along.

(i) What devices do you know of for raising heavy weights?

(ii) Describe, as far as you can,

(*a*) the way in which a window-blind is raised;

(*b*) the arrangements for opening and closing a window;

(*c*) the arrangements for raising and lowering an ordinary sliding window; and

(*d*) the arrangements for raising the cage up a coal-pit shaft.

(iii) Draw a sketch to show how a sack of flour is raised from a lurry to the upper floor of a building.

(iv) How does a quarryman move a large block of stone from the quarry to the cutting shed?

(v) Sketch any different arrangements of pulleys you have seen for raising weights, and show where the weight is placed, and where the pull is applied.

(vi) What do you suppose is the advantage of using a number of pulleys? Has it any disadvantages?

(vii) What do you think is the purpose of the little pulleys over which the signalling wires on the railway pass?

(viii) Why does a man in raising a bucket of mortar to the top of a building pass the rope over a pulley (*a*) instead of over a beam, (*b*) instead of pulling up the bucket direct?

The answers are discussed with the class, with the object of focussing attention on the gaps in the boys' knowledge—suggestions make for first-hand investigation, ordered by the teacher in the manner following:—

Practical Work—Apparatus: Spring balances, movable pulleys, cords, weights, pieces of turned wood, moderately thick glass tubing.

Experiment I.—The effect of altering the direction of a pull.

It is best in all cases fo. the boys *to think out* how they will investigate the problems for themselves with the material at hand. If the boys are slow it might be well to ask for a sketch showing what they propose to do. Give them a few minutes for this, meantime glancing over the suggestions. Now instruct the boys what exactly to do. Those with correct ideas might follow up their own line of attack as well, and compare the results obtained.

(i) Fix a piece of glass tubing firmly to a retort stand.

Take a piece of string about 2 ft. long, knot one end to a weight (say 1 lb.) and fasten the other end to a spring balance.

Note the reading of the balance in various positions.

Write down the readings.

(ii) Substitute a piece of turned wood for the glass and repeat.

(iii) Substitute a pulley and repeat.

If there is any difference in your readings in (i), how would you account for them?

Do you find any difference in the readings in (i), (ii), and (iii)? If you do, how would you explain them?

Would you expect the pull in the string to be the same on each side of the rod? Suggest how to investigate this point.

Experiment II.—Is the pull in the two parts of a string the same?

Continue on these lines, leading up to the principle of the mechanical advantage of pulleys.

3. Consider critically the following Notes of Lessons in the light of what has been said.

(*a*) NOTES OF LESSON ON THE RHINE.

(Boys of twelve.)

I. *Preparatory Work to be done by Class* at home or in private study.

Boys are sent to their atlases to answer the following questions:—

(i) Through what countries does the Rhine flow, and where does it rise?

(ii) Estimate its length, and roughly compare the area of its basin with that of Great Britain.

(iii) What are the names of the four chief tributaries?

(iv) What towns in its basin have you heard of before? In what connexion?

(v) Compare the Rhine between Bingen and Bonn with the Rhine between Bonn and Dusseldorf and with the Dutch Rhine from the point of view of scenery.

II. *Supplementary Work with the Teacher:—*

(*a*) General review of results of the individual work, leading up to division of river course into its five great sections: (i) the Swiss Rhine; (ii) the Rhine Valley; (iii) the Rhine Gorge; (iv) the lower Rhine; (v) the Delta.

(*b*) Descriptive account of above sections, helped out by pictures of glacier, alp, Aar gorge, lakes, waterfalls, pine forest, vine-clad hills, Rhine gorge and castles, delta scenery.

(*b*) NOTES OF LESSON ON IVY.

(Children of nine.)

I. *Preliminary Work by the Children out of School:—*

(*a*) Find out all the places you can where ivy is growing.

(*b*) Find out how the ivy is held to a wall up which it is growing. Compare it with ivy growing up a tree trunk, and ivy spreading along a bank.

(*c*) What is the shape of the ivy leaf? Are all ivy leaves alike? Compare the leaves on the top of the wall with those lower down.

(*d*) Can you find any flowers or fruits on the ivy? Make a drawing of them if you discover any.

II. *Supplementary Work with the Teacher:—*

(*a*) Review the results of children's own observations. The course of the lesson will depend upon these results.

If they are negative in character, description must prepare the way for a second attempt. The probable course will be :—

(i) The way ivy climbs—the "air" roots, *cf.* with tendrils (the relation of the moss to the "air" roots on several specimens). Are "air" roots real roots? Children led to observe their respective characteristics.

(ii) The ivy stem and the arrangement of leaves—a discussion of the probable reasons for this suggested by the children.

(iii) The ivy leaves and their different shapes—discussion leading to suggested reasons for these differences.

(iv) The ivy fruits—does all ivy flower?

Problems that have been raised during the course of the lesson to be answered by first-hand observation of the children out of school hours, e.g. will "air" roots develop into real roots under suitable conditions?

4. Draw up another Notes of Lesson on the Rhine to bring out in greater detail the various types of earth forms and processes met with—e.g. glaciated valleys, origin and history of lakes, dissection of plateau region, loess, alluvium, etc.

5. Study the subject-matter and procedure indicated in the lesson below, and rearrange it on the lines of the lesson on ivy.

ISOTHERMS.

(Boys of twelve.)

Knowledge Assumed :—

(*a*) The meaning of "average".

(*b*) How temperature is measured.

The boys will be provided with outline maps of Britain.

Preliminaries.—Question on the meaning of "average" and the use of the thermometer.

Subject-matter and its Treatment.—I. *Average Temperature.*—The warmth of one day is often compared with that of another. Bring out (1) the variations in this regard during twenty-four hours, (2) the variations in this regard from day to day, and lead up to the notion of average daily temperature. Show a temperature chart to introduce idea of average weekly and monthly temperature.

II. *Temperature Varies from Place to Place* (*reasons later*).—Give examples of average January temperature at various towns over England—Sheffield, Ripon, Manchester, Bristol, etc. Boys consult their hectographed maps. Direct attention to the towns having the same average temperature—boys draw a line joining these—the notion of *temperature belts*. Give the name *isotherm*, and let boys define it.

III. *Factors Influencing Temperature.*—On questioning, boys will probably give (*a*) remoteness of equator; (*b*) the sea; (*c*) the height above sea-level; (*d*) winds. As to (*c*) the higher we rise the colder the air becomes—300 ft. gives a drop of 1° Fahr. Thus at the top of a hill 3000 ft. high, temperature 10° lower than it would be at that place if there were no hill. Isotherm maps are made as if the land were all at the level of the sea. Thus Sheffield is 450 ft. above sea-level—suppose the average temperature actually taken to be $51\frac{1}{2}°$, it is reckoned as 53° for the isotherm map. Illustrate heat belts by means of coloured isotherm map of Britain.

IV. *The Use of Isotherm Maps—Exercises on Subject-matter:*—

(*a*) Boys might make an isotherm chart of a room containing some source of heat.

(*b*) Make isotherm map of Britain for July.

6. Prepare notes of a lesson on "The Hunting of Pau Puk Keewis," showing how you would attempt to demonstrate the following points:—

(Children of eight.)

(i) The preliminary talk serves two purposes:—

(*a*) It seeks to establish the social relationship with its basis of sympathetic understanding, essential to the story-teller and his hearer.

(*b*) It either revives or introduces certain elements which will be needed in the construction of the mental pictures during the telling of the story, so that the thread need not be broken by inquiry and explanation.

(ii) The breaking up of the story into clear pictures. The dancer, the mischief-maker, the beaver pond, the flock of birds, the dust storm, the mountain cave, the eagle.

(iii) The single thread running through the story makes for clearness; this is helped by constant movement, working up to the climax. The race—the final result.

(iv) The appeal to the sense of rhythm—by often introducing Longfellow's lines.

(v) The use of repetition, shown specially in Hiawatha's cries, and in the description of the spirit of Pau Puk Keewis emerging from various forms.

7. Watch an experienced teacher give a drawing lesson. Try to throw his procedure into the form of a "Notes of Lesson". Do the same for a music lesson.

8. Are the following notes of lessons satisfactory (*a*) for a teacher's own use, (*b*) as a sufficient statement of procedure? Give reasons for your answer:—

(*a*) Historical Geography.

(Boys of twelve.)

The lesson will be concerned with the beginnings of the age of discovery, and will aim at showing :—

(i) The mediæval ideas of the world, based on an examination of a map of year 1316.

(ii) The historical conditions which kept the people of Western Europe in ignorance for so many centuries, with especial regard to the horror of the sea, and the struggle between Moslem and Christian.

(iii) The ambitions of Prince Henry the Navigator —

(*a*) To turn the Mohammedan flank, and to effect a junction with the Abyssinian Christians.

(*b*) To convert the heathen.

(*c*) To establish a direct connexion with the Indies.

(*b*) The Norman Keeps at Conisbro and Castleton.

(Boys of eleven.)

(i) Examination of plan of modern cottage. Which is the hall? Why so called?

(ii) Back to beginning of twelfth century, when houses were first built of stone.

Comparison of old vertical and present longitudinal arrangement of rooms in the walls, the entrance, the windows, etc.

(iii) Fortress keeps and residential keeps. Peak and Conisbro.

(iv) Effect on residential building of increasing sense of security and desire for comfort.

(*c*) China and its People.

(Boys of nine.)

The aim of the lesson is to illustrate life in a typical agricultural country.

Preliminaries.—Children led to tell what they know of China and the Chinese.

Subject-matter and its Treatment :—

(i) The Chinaman and his house—a talk centred round two Chinese dolls and picture of Chinese streets.

(ii) The Yellow Land—a simple descriptive account of typical surface features.

(iii) How rice is grown—illustrated by picture.

(iv) Some Chinese conveyances—illustrated by models.

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